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Biomass and Abundance of Demersal Fish Stocks off West and East Greenland estimated from the Greenland Institute of Natural resources Shrimp Fish Survey, 1988-2012.

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Abstract

Since 1988, the Greenland Institute of Natural Resources has annually conducted a bottom trawl survey off West Greenland. The survey was initially designed as a shrimp survey with the focus to evaluate the biomass and abundance of the Northern shrimp (*Pandalus borealis)*. The survey has been continuously developed during the years particularly reflecting the needs of the shrimp assessments. Fish catches have systematically been recorded since 1992. The gear was changed prior to the 2005 survey. The East Greenland area was has been surveyed since 2008. This paper contains; Biomass and abundance indices for East and Westgreenland, and length frequencies from West Greenland for Greenland halibut (Reinhardtius hippoglossoides), redfish (Sebastes marinus and Sebastes Mentella), Atlantic wolffish (Anarhichas lupus), Spotted wolffish (Anarhichas minor), American plaice (Hippoglossoides platessoides) and Thorny skate (Amblyraja radiate). Maps of tow biomass and abundance densities from 2012 for the West and East Greenlandic parts of the survey. Biomass and abundance estimates for Elasmobranchs, Teleosts, Cephalopods and crustaceans excl. Shrimp for the West-Greenland part of the GINR shrimp fish survey including the West-Greenlandic Shelf part of NAFO div 0A. Greenland halibut abundance and biomass changed from a record high in 2011, to a below average in 2012. Golden and deep-sea redfish biomass has increased in the past few years, but the abundance of redfish species combined have decreased about a factor 20 thorough out the time series and was record low in 2012. Spotted wolffish abundance and biomass indices have increased throughout the time series and particular the 2011 biomass estimate was by far the highest observed.

Materials and Methods

The Greenland Shrimp and Fish survey in West Greenland (SFW survey)

The survey has throughout the time series been conducted with the 722 GRT stern trawler M/Tr 'Pâmiut'. The survey design, the area coverage and the trawl and its rigging has been unchanged since 2005. The years prior to 2005 experienced a number of survey developments that are detailed below. The survey period is July to September.

Survey area and stratification: The trawl survey initially covered the traditional offshore shrimp area, between 60º - 72º North, depth 150-600m. In 1991 the area was extended to include the Disko Bay. The area is delimited by a line 3nm off the base line and the 600 m depth curve. Areas shallower than 150 m was initially rather unsystematically covered but from 2004 two extra depth zones have been formally included (50-100m, and 100-150m).

The stratification is based on designated 'Shrimp Areas' that is divided into depth zones of: 151-200, 201-300, 301-400 and 401-600 m, as based on depth contour lines (figure. 1). The depth zones 0-100 m and 100-150m is delimited by the NAFO Subdivision boundaries. The ""shrimp Areas" and their sizes are provided in table 1. The number of valid hauls by year and stratum is listed in table 2.

Cod, as well as other ground fish species that historically have been assessed by NAFO, was up to 2007 analysed using a re-stratification that followed the NAFO divisions. Re-stratification implies a potential bias and the survey information from 2005 and onwards has therefore been reanalysed in accordance with the shrimp strata actually used in the survey. If no stations was a strata is not visited in a single year, the neighbouring strata is geographically enhanced with area of the non-visited strata.

The Survey Gear and trawl: The survey initially used a Skjervoy 3000/20 trawl with steel bobbin gear and double bag. In 2005 the skjervoy trawl was replaced by a "Cosmos" trouser trawl (Wieland and Bergström, 2005). Until 2003, *Greenland Perfect* trawldoors were used (9.25 m², 2.4 tons). However, in 2004 they were replaced by Injector International trawl doors (7.5 m², 2.8 tons) to facilitate the trawl change in the year after. Calibration experiments with the two trawls were conducted in the main shrimp areas in 2004 and 2005 and a formal analysis of conversion factors were established for shrimp (Rosing and Wieland, 2005). However the calibration factors for the different fish species were never finally evaluated. Preliminary conversion factors were derived as described by Rosing and Wieland (2005) and are given in table 3.

Tow duration. Tow duration has over the years been gradually reduced from 60 min. (prior to 1997) to 30 and has been fixed to 15 min since 2005 (Wieland and Storr-Paulsen 2006). Towing speed has been about 2.5 knots throughout the years. Survey abundance and biomass is expressed per swept area: Wingspread*towed distance, where wingspread is inferred from Scanmar recordings and the towed distance is measured by GPS.

Allocation of trawl hauls. Trawl stations are allocated to strata with the objective to minimise the variances of the shrimp biomass. The allocation algorithm utilises the historically observed shrimp variances where highest weight is placed on the most recent information. Stations positions were initially selected at random but since 1999 station positions were chosen to secure a minimum distance between stations. Since 1998 about half of the haul positions were randomly selected from the previous year hauls; the rest of the hauls being selected at random.

The Greenland Shrimp and Fish survey in East Greenland (SFE survey)

The survey is carried out with the same gear and survey protocols as used in West Greenland after 2005. Stratification is based on the "Q-areas" used for the East Greenland survey for Greenland halibut. The areas are further depth stratified into 0-200 m, 200-400m and 400-600 m zones, the areas are shown in figure. 1. and the area sizes are given in table 1.

The major difference between West and East Greenland is the bottom conditions that severely restrict the areas that can be trawled off East Greenland. Stations were randomly selected from historical known trawlable sites, however, a number of the selected positions were not deemed trawlable.

Results

Greenland halibut (*Reinhardtius hippoglossoides*).

In Westgreenland, Greenland halibut can be found in all divisions, but is most abundant in the important nursery areas in division 1A and 1BN and 1AX (Disko Bay) (table 4, 5). Both abundance and biomass indices for Greenland halibut increased during the 1990's. The 50% increase in biomass from 2003 to 2004 could be related to the change from "Greenland perfect" to "injector" trawl doors and the changes from 2004 to 2005 could be related to the change in survey trawl. When regarding the 2005 to 2012 period, the abundance index decreased from a record high in 2011 to a record low in 2012 and the biomass also decreased substantially from 2011 to 2012 (figure 2). Although some caution should be given when interpreting these indices, the general impression is a decreasing trend in both biomass and abundance from 2005 to 2012. Clear modes can be found in the length distribution at 15 and 23 cm every year probably corresponding to yearclasses 1 and 2 (figure. 5). Distribution of survey catches in number pr. km^2 and kg pr. km^2 are given in figure 11. and figure.12.
In Eastgreenland recruits are rarely seen and both abundance and biomass indices are much lower on the shelf areas (table 4 and 5).

Greenland halibut recruitment.
A recruitment index was estimated for the entire survey area. By means of the Petersen-method ages 1, 2 and 3+ were separated in the survey catches. The number of one-year-old fish in the total survey area including Disko Bay increased gradually from 1996 to a peak of 500 million in 2001. The number of one-year old fish was in 2011 estimated as 530 mill. which is an increase from 310 mill.in 2010 and the highest in the time series. The increase between 2010 and 2011 was caused by an increase in abundance both offshore in Div. 1A and inshore in Disko Bay. The 2011 year class was estimated to 175 mill. - the lowest estimate since 1996 and at the level of the early 90'es (figure. 8a, b, c).

To allow comparison of abundance throughout the time series, the 2005 to 2012 catches were divided by a conversion factors to adjust the new Cosmos trawl catches to the old Skjervoy trawl catches. For Greenland halibut the conversion were length dependent and x in the equations is the individual fish length. Greenland halibut conversion factor:
0.0404x+0.6527.

The offshore recruitment has been rather stable between 2003 and 2010. The recruitment increased to the highest level in the time series in 2011 to decrease to lowest level seen since 1997 (1996 year-class). In 2012 61% of the one year old fish was found in the off shore areas (figure. 8d). The decrease in recruitment between 2011 and 2012 was seen in all divisions (figure. 8e).

In Disko Bay the recruitment has been decreasing between 2003 and 2008 and increased since then to the highest level seen since 2001 in 2011. In 2012 the recruitment decreased again to the lowest level seen since 2008 (figure. 8 e).

Generally there is a steep decline between abundance at age 1 and age 2 and 3+ (figure. 8f) which also was observed in the 2012 survey. Further, it has been noted, that the year-classes estimated to be a very strong year-class at age 1 have not shown up as a particularly strong year-classes at age 5-8 in the fishery catches or in the 1CD survey for Greenland halibut.

Demersal Redfish (*Sebastes sp.*) combined.

Two species of redfish are common in the area, golden redfish, *Sebastes marinus* and deep-sea redfish *Sebastes mentella*. Due to difficulties in identification of species in some years redfish were classified as *Sebastes* (prior to 2007). Juvenile redfish less than approximately 20 cm are classified as juvenile "*Sebastes sp"*. The distinction is however not straight forward and often small redfish are classified as Sebastes Mentella, which in Westgreenland has also dominated individuals up to 30 cm in recent years (figure 6). Redfish are present in all divisions, but recruits are most abundant in division 1B (table 6, 7 and figure 2). The abundance indices have decreased about a factor 20 throughout the time series (tabel 6, figure 3), mainly caused by the disappearance of recruits. Biomass of

demersal species of redfish combined decreased to about a third the initial values throughout the 1990's but stabilized during the 2000's and has been slightly increasing since 2009 (table 7 and figure 3). Annual growth increments of 4 cm were indicated by repeatedly pronounced peaks in length compositions at 7-8 cm and 12 cm probably corresponding to age 1 and 2 (Nedreaas, 1990). Densities by haul in number pr. km^2 and kg pr. km^2 are given in figure 16 - 18.
In East-Greenland sebastes mentella is further divided into a demersal and two pelagic stocks (beeked) of redfish, a shallow and deep pelagic stock.

Clasification of redfish species.

In Westgreenland, Separation of redfish by haul has been attempted since 2007 (table 8-13, figure 10). Particularly the separation of *sebastes mentella* and juvenile redfish varies from year to year. The decrease in juvenile redfish is therefore cancelled by an increase in deep-sea redfish (table 8-11). Larger individuals are easier to separate, leading to increased credibility of the classification of golden redfish. Golden redfish biomass has increased in 2011 and 2012 (table 12 and 13). The increase was seen particularly in division 1F and was in 2012 caused by one haul of large individuals (figure 10) giving more than half the total West Greenland biomass. The sudden increase in larger individuals of golden redfish could indicate a connection with the Icelandic and East Greenlandic stock of Golden redfish.
In East-Greenland sebastes mentella is further divided into a demersal and two pelagic stocks (beeked) of redfish, a shallow and deep pelagic stock.

American plaice (*Hippoglossoides platessoides*).

In Westgreenland, American plaice is common in all divisions, but the main areas are division 1A to 1D. Since 2005 the abundance index has fluctuated between 85 and 230 million and the biomass index has fluctuated between 6200 tons and 14190 tons, without any clear trend. (table 14 and 15, and figure 4). Clear modes can be found at 5 and 15 cm indicating new incoming year-classes and individuals larger than 45 cm are rarely seen (figure. 11). Densities by haul in number pr. km^2 and kg pr. km^2 are given in figure 19.

Atlantic wolffish (*Anarhichas lupus*)

In Westgreenland, Atlantic wolffish is common in all divisions, but the distribution has shifted further north since the beginning of the time series. Previously Atlantic wolffish was mainly found south of 68°00'N (table 16 and 17). The highest estimate in the time series for both abundance and biomass was found in 2005, but indices have decreased since then. The length distribution reveals the dominance of small fish < 35cm, although the proportion of larger fish has increased in the past years (figure. 12). Individuals above 65 cm are virtually absent. Densities by haul in number pr. km^2 and kg pr. km^2 are given in figure 20.

Spotted wolffish (*Anarhichas minor*)

In Westgreenland, spotted wolffish are located in all divisions, but the majority of the stock is found in divisions 1A and 1B. Both abundance and biomass indices have increased throughout the time series and particular the 2011 biomass estimate was by far the highest observed. (tables 18 and 19). In length ranges from 10-120 cm and occasionally weak modes at 13 cm can be identified. (figure. 13). Densities by haul in number pr. km^2 and kg pr. km^2 are given in figure 21.

Thorny skate *(Amblyraja radiata*)

In Westgreenland, thorny skate are common in all divisions but the majority of both the biomass and abundance is located in division 1A and 1B. The only significant change happened from 2004 to 2005 indicating a poor calibration factor, leaving the impression of a slightly increasing stock over the time series (table 20 and 21, figure 7). In recent years Thorny skate length distributions have revealed clear modes at 12 cm and 42 cm probably corresponding to recruits and adult individual (figure. 14). Densities by haul in number pr. km^2 and kg pr. km^2 are given in figure 22.

Cod (*Gadus morhua*)

For data on cod see the ICES Report of the North-Western Working Group (Anon., 2012)

The Appendix contains biomass and abundance estimates for elasmobranchs, teleosts, cephalopods and crustaceans excl. Shrimp for the West-Greenland part of the GINR shrimp fish survey including the West-Greenlandic Shelf part of NAFO div 0A.

Discussion

Interpretative cautions.
Catchability is set at 1 for all species. However, since swept area is calculated for the trawl excluding doors and bridles, catchability may be higher than 1 for some species and below 1 for other species, implying that both biomass and abundance should be regarded as index values only, not absolute values.
Index changes from the end of the 1990's to 2001 for species related to shallow water and banks (50-150m) could reflect better coverage of these depths during the past decade. Changes from 2003 to 2004 could be influenced with the trawl door update from Greenland perfect to injector and may be species dependant, as no calibration experiments were made on this account. Index changes from 2004 to 2005 could be related to species specific data quality in the calibration experiments.

The main purpose of the survey is to evaluate the biomass of northern shrimp and the effort is concentrated in areas and depths where the commercial shrimp trawling is taking place, especially on the northern slopes of the bank Store Hellefiskebanke (67°50N 55°00W) and in the inshore area Disko Bay. As Store Hellefiskebanke and Disko Bay are important nursery areas for Greenland halibut and redfish, as well as other important species (Smidt, 1969; Tåning, 1949) it is likely, that the abundance estimates of the survey reflects the juvenile stock situation of these species.

The 2002 estimates in division 1AN may have been affected by low coverage in this division, since only 2 hauls was performed in this division in 2002 and therefore not all strata can have been covered. No record exists on whether any compensation for low coverage was made in subarea 1AN in 2002.

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Table 1: The survey area (km^2) in the Greenland Shrimp and Fish Survey.

West Greenland							
	Depthstrata						
Area	<100	100-150	150-200	200-300	300-400	400-600	Total
W1	-	-	2885	6138	7343	921	17287
W2	-	-	1581	2468	1512	805	6366
W3	-	-	2216	4653	2188	2883	11940
W4	-	-	4006	1781	886	2027	8700
W5	-	-	2424	3584	2180	2865	11053
W6	-	-	1252	1916	1707	1206	6081
W7	-	-	1977	880	244	220	3321
W8	-	-	357	516	476	636	1985
W9	-	-	2003	991	740	477	4211
C0	-	-	-	895	2202	1210	4307
I1	-	-	321	1818	2325	1407	5871
I2	-	-	330	728	1000	1294	3352
U1	-	-	2431	4587	4687	5061	16766
U2	-	-	-	6334	8360	7983	22677
U3	-	-	1975	3332	1704	2737	9748
1A	3039	5220	-	-	-	-	8259
1B	11346	4966	-	-	-	-	16312
1C	4183	8169	-	-	-	-	12351
1D	4136	1538	-	-	-	-	5673
1E	494	2721	-	-	-	-	3215
1F	1497	5248	-	-	-	-	6745
All strata							186221

East Greenland				
	Depthstrata			
Area	0001-0200	0201-0400	0401-0600	Total
Q1	217	35445	6975	42637
Q2	93	7657	1246	8996
Q3	3363	22547	9830	35740
Q4	1337	7770	2054	11161
Q5	469	2785	1819	5073
Q6	6307	6130	2063	14500
All strata				118107

Table 2. Numbers of valid hauls, 1988-2009. 1AX=Disko Bay. 0A= The West-Greenlandic shelf part in Canadian waters. (- area included in neighboring strata)

West Greenland											
Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	Total
1990		29	63	*	68	17	35	16	*	*	228
1991		18	39	41	44	18	11	16	*	*	187
1992		20	33	39	36	8	18	18	11	15	198
1993		16	22	31	39	10	21	15	12	13	179
1994		16	33	27	49	9	23	8	9	9	183
1995		17	33	33	48	13	29	13	14	11	211
1996		18	20	33	46	11	29	12	9	11	189
1997		17	33	34	47	9	32	12	12	19	215
1998		10	34	33	66	14	27	19	14	14	231
1999		10	40	34	63	18	33	16	14	17	245
2000		8	25	23	45	17	37	23	14	29	221
2001		9	28	23	59	16	36	24	15	26	236
2002		2	26	22	68	12	32	18	20	27	227
2003		11	21	19	51	12	30	18	15	22	199
2004		15	25	14	41	14	24	22	20	34	209
New survey gear introduced											
2005	6	20	30	16	45	10	26	19	23	23	212
2006	5	26	40	21	49	9	27	20	21	31	244
2007	8	18	38	18	47	9	27	27	31	39	254
2008	6	16	38	16	53	7	28	23	25	46	252
2009	8	21	31	24	60	13	28	22	24	48	271
2010	10	26	44	25	65	11	30	23	24	40	289
2011	-	17	31	26	54	9	24	18	12	25	216
2012	-	18	34	21	52	12	21	18	18	26	220

East Greenland							
Year	Q1	Q2	Q3	Q4	Q5	Q6	Total
2008	8	6	12	7	7	12	52
2009	21	12	26	19	6	13	97
2010	19	14	24	9	6	10	82
2011	20	11	21	12	7	14	85
2012	19	16	28	13	7	15	98

Table 3. Preliminary calibration factors to adjust the Cosmos trawl catches to the former Skjervoy trawl standard. For Greenland halibut and American plaice the conversion were length dependent and for those species x in the equations represents the individual fish length.

Fishspecies	Greenland halibut	Redfish	American plaice	Atlantic wolffish	Spotted wolffish	Cod	Thorny skate
Conversion factor	0.0404x+0.6527	2.4	-0.0825x + 5.3307	2.3	2.3	1.78	5.1
Trawl size factor	1/1.1516	1/1.1516	1/1.1516	1/1.1516	1/1.1516	1/1.1516	1/1.1516
Final factor	0.035x+0.567	2.0	-0.072x + 4.629	2.0	2.0	1.5	4.4

Table 4. Greenland halibut (*Reinhardtius hippoglossoides*). Abundance indices (Millions) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl	cv
1992		50.7	8.2	96.7	231.5	1.5	1.2	0.8	0.6	0.0	391.2	27		
1993		29.1	24.3	34.0	152.6	9.8	4.3	4.6	0.4	0.5	263.5	28		
1994		22.9	35.2	63.0	130.7	10.0	18.1	2.4	0.1	0.4	282.8	22		
1995		39.5	28.9	89.4	98.9	18.3	12.2	5.7	0.1	0.3	293.4	32		
1996		92.6	13.7	102.5	265.9	11.8	14.0	10.7	0.2	0.4	511.7	25		
1997		41.3	17.5	112.1	97.6	2.2	13.0	0.9	0.1	0.3	285.0	22		
1998		78.5	30.4	209.6	47.2	23.3	7.2	3.6	1.4	0.6	401.6	29		
1999		100.8	58.2	95.4	91.0	5.8	5.3	7.7	1.3	0.9	366.3	35		
2000		81.7	19.3	172.8	126.7	4.1	4.8	6.7	0.1	0.6	416.8	30		
2001		145.9	97.9	223.7	111.5	1.7	4.8	2.6	0.7	1.6	590.2	28		
2002		78.0	75.2	148.1	42.5	2.7	6.2	6.5	0.6	1.3	360.9	38		
2003		154.6	37.7	227.0	116.7	2.3	2.0	2.4	0.1	1.0	543.8	36		
2004		154.8	20.6	199.1	84.8	2.4	2.9	2.8	0.1	0.4	468.0	34		
New survey gear introduced														
2005	3.3	177.5	51.6	186.5	202	5.3	9.1	1.9	1.1	0.5	638.8	12		
2006	14.1	110.5	69.9	96.9	198.6	4.2	24.6	0.8	0.0	0.3	520.0	11		
2007	10.5	103.1	75.3	128.5	154.4	2.2	37.9	0.3	1.2	0.4	513.8	13		
2008	13.2	184.2	106.5	64.6	88.6	0.7	0.6	0.9	0.3	0.3	459.9	12	3.0	53
2009	8.0	132.8	75.3	72.9	119.6	6.9	0.7	0.9	0.3	0.1	417.5	8	4.1	120
2010	9.1	154.5	117.7	123.3	115.9	4.5	0.7	1.2	0.1	0.1	527.1	9	3.0	43
2011	-	318.8	111.6	230.7	93.4	8.9	1.1	0.9	0	0.2	765.6	16	2.9	37
2012	-	80.2	48.8	105.9	52.3	5.0	0.4	0.1	0	0.1	292.8	8	1.7	46

Table 5. Greenland halibut (*Reinhardtius hippoglossoides*). Biomass indices (tons) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl	cv
1992		3516	785	4992	4203	402	206	97	48	0	14250	22		
1993		2483	1286	2507	4255	747	595	539	333	60	12804	27		
1994		2007	1697	3598	4748	1665	1458	91	10	25	15199	26		
1995		4367	1291	5786	2567	825	971	502	12	45	16365	51		
1996		3682	1294	8593	5496	439	1248	899	9	118	21778	22		
1997		4972	1746	6456	4929	421	1754	180	25	84	20567	29		
1998		7025	4976	11874	2821	1724	863	275	117	278	29955	35		
1999		10205	6025	8060	5224	555	778	261	48	318	31473	44		
2000		3411	1713	9537	3985	454	692	567	38	280	20676	30		
2001		8433	2478	10161	3802	278	1208	289	33	443	27126	32		
2002		6158	2067	9070	3108	779	737	670	39	402	23055	40		
2003		8297	3399	16556	5693	478	589	297	4	355	35668	28		
2004		15182	2079	28229	11755	1147	420	319	2	201	59332	36		
New survey gear introduced														
2005	421	22894	7010	22580	17150	574	1129	347	263	412	72780	12		
2006	519	15179	4516	20246	13797	519	6693	93	0	206	61769	12		
2007	769	11603	5666	13137	6950	163	5920	3	82	246	44539	18		
2008	402	19559	4417	16422	7822	147	302	120	59	179	49429	13	4850	40
2009	229	21764	2634	19902	7047	478	324	164	16	25	52584	20	4454	100
2010	489	25880	7071	17559	8658	599	54	320	1	58	60688	11	5729	33
2011	-	18213	6778	23977	13945	640	364	49	0	14	64547	10	3825	34
2012	-	10331	4327	16168	9194	1475	225	7	4	81	41813	7	2439	51

Table 6. Redfish (*Sebastes sp.*). Abundance indices (million) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl	cv
1992		1	146	9	1006	187	69	34	6	4	1462	32		
1993		4	210	17	361	22	157	182	97	520	1568	69		
1994		12	187	12	1573	225	273	85	10	84	2461	26		
1995		1	67	11	559	33	183	93	5	5	957	23		
1996		1	8	8	1688	59	124	63	11	54	2017	29		
1997		5	43	7	348	58	156	57	23	22	719	24		
1998		1	24	20	236	15	115	71	10	32	522	24		
1999		2	69	9	287	11	11	61	4	23	574	21		
2000		0	27	6	27	32	28	10	18	159	165	23		
2001		2	77	3	25	15	20	12	1	180	183	60		
2002		1	23	1	50	84	43	44	2	10	257	27		
2003		2	45	2	210	32	79	25	2	26	423	23		
2004		2	11	1	52	39	47	30	2	69	253	37		
New survey gear introduced														
2005	184	1	19	1	73	79	77	25	12	80	551			
2006	27	7	25	1	110	52	83	16	3	11	334			
2007	97	2	37	0	128	34	49	5	3	17	371			
2008	99	2	40	0	121	33	24	3	2	11	334		1847	
2009	37	2	29	0	115	26	12	1	2	9	234		1988	
2010	27	6	27	0	69	42	23	8	3	8	213		1566	
2011	-	10	23	1	121	18	31	13	1	9	225		2517	
2012	-	7	10	0	42	13	20	10	2	16	120		1018	

Table 7. Redfish (*Sebastes sp.*). Biomass indices (tons) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl.	cv	E-Grl.	cv
1992		69	18117	437	13423	2832	1576	1124	169	147	37894	43		
1993		195	4994	710	6420	300	1549	3835	1923	2138	22065	38		
1994		590	5076	538	16064	1986	3886	995	179	1272	30586	24		
1995		52	1585	775	5029	869	2963	1952	358	123	13705	22		
1996		18	117	782	12178	1694	2552	1980	304	1788	21413	28		
1997		599	1481	337	4913	1597	6766	1901	1099	1229	19922	31		
1998		39	1467	1423	6193	2130	3274	1953	606	1198	18283	22		
1999		164	4021	742	5596	999	2742	2976	207	1124	18671	25		
2000		0	1790	793	1045	2185	2337	463	2411	1214	12237	36		
2001		192	5380	536	1746	1460	2637	1069	60	2256	15337	50		
2002		55	1917	397	2536	2386	1676	2654	272	998	12891	28		
2003		279	2886	702	6357	2319	6185	1918	187	2476	23308	32		
2004		369	462	368	2210	2274	2996	1679	101	1026	11486	41		
New survey gear introduced														
2005	3491	134	1378	665	3370	6974	6212	2751	1388	2771	29132			
2006	591	1129	2196	759	4427	2717	6213	959	557	2350	21897			
2007	3367	248	2172	153	6886	1499	5166	358	282	1778	21908			
2008	2845	433	2221	210	7411	4007	2542	224	286	2585	22761		290666	
2009	1696	356	2472	193	5496	3688	1951	293	335	1339	17819		318517	
2010	1348	761	3363	910	4765	4193	3073	1043	369	1069	20895		336840	
2011	-	1917	1536	1486	8362	3538	5377	4026	226	2397	28865		511700	
2012	-	1382	1224	998	4380	2438	3560	1942	239	10341	26505		234650	

Table 6. Juvenile redfish <20cm (*Sebastes sp.*). Abundance indices (million) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl	cv
2006	27	6	20	0	107	51	79	15	2	7	314	16		
2007	96	0	28	0	120	33	44	4	2	15	342	15		
2008	97	0	36	0	118	0	9	2	1	6	269	26	452	53
2009	36	0	14	0	111	1	4	0	1	4	172	24	954	28
2010	24	0	9	0	33	0	3	4	2	5	80	21	507	31
2011	-	0	15	0	70	1	0	2	0	0	89	23	102	61
2012	-	0	2	0	16	0	1	0	1	0	21	23	253	56

Table 7. Juvenile redfish <20cm (*Sebastes sp.*). Biomass indices (tons) for West Greenland with 95% confidence limits in percent of the stratified mean. () incomplete coverage of survey area.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	CI	E-Grl	CV
2006	489	650	1433	0	3270	2238	4623	746	111	1162	14722	18		
2007	2912	0	1475	0	3985	1142	4262	156	87	821	14839	16		
2008	2358	2	1678	0	5198	2	154	44	12	55	9503	29	9011	53
2009	1365	0	491	3	3571	36	160	9	24	90	5749	29	41341	63
2010	919	0	394	0	1524	0	105	161	66	154	3323	29	24135	31
2011	-	9	289	1	2579	47	19	88	25	18	3074	32	3781	56
2012	-	0	52	0	557	9	32	13	21	16	700	24	36567	79

Table 6. Deep-sea (*Sebastes mentella.*). Abundance indices (million) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl	cv
2006	0	1	1	0	1	1	1	1	0	2	8	24		
2007	0	0	0	0	6	0	0	0	0	1	8	52		
2008	1	1	4	0	2	33	14	0	0	2	57	56	1286	49
2009	1	2	14	0	4	24	7	1	0	4	55	45	895	29
2010	2	5	16	0	35	41	19	4	0	3	127	36	995	36
2011	-	9	8	0	49	16	27	7	0	6	122	22	400	22
2012	-	6	7	0	24	12	16	8	1	4	79	10	305	27

Table 7. Deep-sea (*Sebastes mentella.*). Biomass indices (tons) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl	cv
2006	11	168	65	77	252	274	543	64	34	544	2032	22		
2007	84	0	30	28	1443	0	8	28	11	277	1909	84		
2008	141	245	385	9	432	3989	2209	71	50	395	7926	49	247557	47
2009	79	239	1659	45	618	2989	1420	213	8	828	8098	38	236680	35
2010	141	606	1831	11	2281	4039	2322	608	56	621	12519	36	283924	36
2011	-	1300	998	4	3441	3156	4129	1509	71	1540	16149	24	122949	26
2012	-	1041	886	334	2084	2093	2340	1386	154	878	11195	9	100342	29

Table 6. Golden redfish (*Sebastes marinus.*). Abundance indices (million) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl	cv
2006	0	0	3	0	2	0	2	0	1	2	12	23		
2007	1	2	8	0	2	1	5	0	0	1	21	43		
2008	1	0	0	0	1	0	1	0	0	4	9	25	108	29
2009	1	0	1	0	1	1	1	0	1	2	6	15	139	27
2010	0	0	1	0	1	1	1	0	1	0	6	17	64	36
2011	-	1	0	1	2	1	3	3	1	2	14	12	2015	36
2012	-	0	1	0	2	0	2	2	0	12	20	54	460	36

Table 7. Golden redfish (*Sebastes marinus*). Biomass indices (tons) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl.	cv
2006	92	311	698	682	905	204	1047	149	413	644	5144	16		
2007	371	248	667	126	1459	356	896	174	184	679	5160	27		
2008	345	185	157	201	1781	15	180	109	224	2135	5332	41	34098	32
2009	252	117	321	146	1308	663	370	70	303	422	3971	18	40496	27
2010	288	155	1137	899	960	154	646	275	246	293	5053	28	28781	32
2011	-	607	249	1482	2342	334	1229	2429	130	839	9642	21	384970	36
2012	-	341	286	664	1740	336	1188	543	65	9447	14609	61	97741	28

Table 8. American plaice (*Hipplogossoides platessoides*). Abundance indices (‘million) for West Greenland with 95% confidence limits in percent of the stratified mean. () incomplete coverage of survey area.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl.	cv	E-Grl	cv
1992		1.4	1.0	2.8	1.4	0.6	1.7	1.4	0.5	0.1	10.8	22		
1993		1.3	1.7	1.2	3.0	0.8	2.0	1.7	0.6	0.9	13.2	24		
1994		2.2	3.7	3.3	14.9	7.0	9.5	0.7	0.3	0.5	42.0	32		
1995		1.0	0.6	1.8	6.3	0.9	2.7	3.0	0.3	0.5	17.2	29		
1996		1.6	3.4	7.3	4.6	1.7	4.2	3.1	0.1	0.7	26.6	18		
1997		6.6	2.0	2.7	15.1	1.0	10.4	2.0	0.3	0.7	40.8	47		
1998		1.6	1.9	2.4	3.6	1.2	1.5	6.4	0.9	5.6	25.2	27		
1999		0.5	1.7	2.0	6.8	1.2	5.3	1.9	1.0	0.6	20.9	18		
2000		1.8	4.8	6.7	14.8	1.9	3.5	3.8	0.5	0.5	38.5	23		
2001		1.3	1.3	2.2	13.6	1.5	3.5	2.3	0.6	0.6	26.8	31		
2002		0.0	3.8	4.7	8.8	1.8	5.1	31.8	1.5	1.8	59.5	49		
2003		2.2	5.2	5.5	25.7	1.6	13.7	15.0	0.8	2.0	71.7	22		
2004		0.7	1.4	5.3	11.9	2.8	10.2	8.9	0.6	1.6	43.4	27		
New survey gear introduced														
2005	3.5	2.1	13.7	5.8	59.9	17.3	74.5	19.5	6.1	5.6	208.0	9		
2006	3.9	1.3	15.0	10.9	40.3	10.0	38.1	21.6	4.4	4.5	150.0	10		
2007	6.5	0.6	12.3	6.3	46.8	9.4	31.2	11.9	2.6	2.7	130.8	12		
2008	7.1	3.7	10.8	4.0	29.5	2.2	13.5	11.4	1.3	1.3	84.8	8	17.2	22
2009	2.9	5.6	18.0	14.3	41.4	8.1	11.6	7.6	1.1	2.3	112.8	9	20.2	12
2010	9.5	2.8	40.7	14.3	50.7	9.2	34.4	20.3	1.2	2.1	185.2	8	17.4	19
2011	-	8.6	40.7	17.1	103.6	6.2	30.3	21.6	0.8	1.9	230.7	11	17.5	16
2012	-	2.3	18.3	15.3	51.3	8.3	19.4	11.4	0.9	1.1	129.4	9	10.4	22

Table 9. American plaice (*Hipplogossoides platessoides*). Biomass indices (tons) for West Greenland with 95% confidence limits in percent of the stratified mean. () incomplete coverage of survey area.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl.	cv	E-Grl	cv
1992		57	54	213	78	51	137	128	55	6	779	23		
1993		56	72	87	90	28	107	141	69	43	694	26		
1994		112	293	277	487	308	284	60	22	64	1906	22		
1995		65	54	279	191	51	87	130	19	18	895	18		
1996		119	264	670	231	74	142	119	7	27	1654	18		
1997		323	150	287	398	87	367	135	31	25	1803	21		
1998		154	178	328	185	48	82	398	97	102	1573	20		
1999		81	136	170	287	43	202	145	65	44	1173	17		
2000		175	278	408	551	74	178	227	89	40	2021	18		
2001		169	79	140	403	65	162	153	38	67	1276	17		
2002		0	184	327	414	151	275	1061	92	67	2570	23		
2003		196	352	338	1013	125	680	1048	59	171	3980	20		
2004		138	143	192	537	128	715	747	38	150	2789	27		
New survey gear introduced														
2005	246	346	944	722	3049	1136	4511	2196	470	569	14190	8		
2006	268	210	608	1148	2288	702	3534	2163	399	380	11699	13		
2007	356	112	544	731	2877	731	2418	810	230	308	9118	12		
2008	371	437	648	382	1889	212	1067	898	128	149	6181	9	2495	42
2009	183	556	649	643	1977	585	826	825	102	127	6473	7	2577	15
2010	355	235	1539	1214	2436	748	2128	1460	105	224	10442	9	3181	30
2011	-	463	1364	1459	5464	792	1391	2020	99	208	13256	7	4385	26
2012	-	236	756	730	3508	662	1350	777	121	178	8317	9	2702	33

Table 10. Atlantic wolffish (*Anarhichas lupus*). Abundance indices (millions) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl	cv
1992		0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.1	0.1	0.8	33		
1993		0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.3	1.2	41		
1994		0.0	0.1	0.0	0.3	0.2	1.9	0.4	0.4	1.6	4.9	36		
1995		0.0	0.0	0.0	0.1	0.1	0.4	0.1	0.4	0.2	1.3	34		
1996		0.0	0.1	0.0	0.1	0.1	0.4	0.2	0.6	0.6	2.0	50		
1997		0.0	0.0	0.0	0.2	0.0	0.8	0.2	0.3	0.1	1.7	28		
1998		0.0	0.3	0.0	0.3	0.1	0.7	0.4	0.5	0.7	3.0	30		
1999		0.0	0.2	0.1	0.1	0.1	0.4	0.2	0.4	0.4	2.0	44		
2000		0.0	0.5	0.1	0.3	0.4	0.4	0.6	1.7	0.0	4.0	69		
2001		0.0	0.1	0.2	0.4	0.1	0.2	0.4	0.2	0.1	1.5	40		
2002		0.0	0.4	0.1	0.5	0.0	0.9	0.6	1.1	0.5	4.1	33		
2003		0.0	0.1	0.6	2.3	0.2	1.5	0.5	2.3	1.1	8.8	27		
2004		0.0	0.1	0.3	1.6	0.9	0.2	0.3	0.7	0.3	4.4	39		
New survey gear introduced														
2005	0.1	0.0	0.5	0.0	1.5	0.6	6.9	2.4	5.5	1.5	19.1	16		
2006	0.0	0.1	0.8	0.1	0.9	0.6	2.4	1.2	1.0	2.8	9.8	14		
2007	0.0	0.0	0.7	0.0	1.3	0.6	0.7	0.3	0.4	0.7	4.8	15		
2008	0.2	0.0	1.0	0.1	0.7	0.5	1.0	0.5	0.4	0.3	4.6	15	4.7	26
2009	0.0	0.1	1.0	0.1	0.7	0.4	1.5	0.2	1.1	0.4	5.6	19	12.2	35
2010	0.1	0.4	2.6	0.1	2.3	0.6	3.1	0.8	0.9	0.6	11.4	8	5.3	17
2011	-	0.1	1.1	0.1	1.3	0.3	0.5	0.9	0.3	0.4	5.0	14	6.4	40
2012	-	0.0	2.2	0.2	1.6	0.3	0.7	1.2	0.3	0.6	7.0	18	3.8	22

Table 11. Atlantic wolffish (*Anarhichas lupus*). Biomass indices (tons) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl	cv
1992		0	7	0	8	21	47	22	28	31	163	33		
1993		0	5	6	1	2	26	35	29	188	292	64		
1994		0	12	9	40	39	198	30	65	249	644	38		
1995		0	0	0	22	9	38	24	90	36	219	40		
1996		0	1	3	17	23	41	35	103	101	324	53		
1997		0	3	0	21	1	115	16	58	15	228	30		
1998		0	3	2	13	9	60	34	104	133	358	38		
1999		0	4	13	21	12	8	6	202	62	329	79		
2000		0	20	3	52	31	55	54	396	15	626	90		
2001		0	1	3	11	1	16	21	42	23	117	40		
2002		0	9	2	77	5	73	78	216	118	579	37		
2003		0	2	41	267	64	361	60	205	148	1148	24		
2004		0	6	19	160	56	96	21	162	100	620	27		
New survey gear introduced														
2005	11	0	76	5	201	123	1564	348	890	640	3858	16		
2006	3	4	58	60	127	134	359	168	172	1241	2326	20		
2007	0	0	73	6	357	326	147	107	122	533	1670	21		
2008	15	0	76	31	124	55	348	88	136	226	1098	16	1091	26
2009	0	3	109	30	155	72	275	92	211	648	1595	31	2870	32
2010	10	12	509	51	350	144	668	134	104	345	2327	17	1295	25
2011	-	46	96	64	197	69	121	233	63	205	1094	17	1633	40
2012	-	0	239	82	506	44	79	252	64	444	1708	23	1172	20

Table 12. Spotted wolffish (*Anarhichas minor*). Abundance indices (millions) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl	cv
1992		0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.3	28		
1993		0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.4	36		
1994		0.0	0.3	0.0	0.2	0.1	0.4	0.0	0.0	0.0	1.1	33		
1995		0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4	22		
1996		0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.5	24		
1997		0.1	0.3	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.8	23		
1998		0.1	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.6	25		
1999		0.9	0.3	0.1	0.4	0.1	0.0	0.0	0.0	0.0	1.7	42		
2000		0.0	0.8	0.0	0.5	0.1	0.0	0.0	0.1	0.0	1.6	28		
2001		0.3	0.4	0.1	0.3	0.0	0.0	0.0	0.0	0.0	1.1	27		
2002		0.3	2.1	0.1	0.4	0.1	0.1	0.1	0.0	0.0	3.1	42		
2003		0.5	1.5	0.2	1.4	0.0	0.6	0.0	0.0	0.1	4.3	24		
2004		0.2	0.7	0.2	0.6	0.0	0.1	0.1	0.0	0.1	2.1	30		
New survey gear introduced														
2005	0.0	1.2	1.9	0.0	0.7	0.2	0.4	0.3	0.2	0.1	5.1	23		
2006	0.0	0.4	1.0	0.1	1.4	0.3	0.3	0.2	0.1	0.2	3.9	23		
2007	0.1	0.5	1.0	0.1	1.5	0.4	0.2	0.1	0.0	0.1	3.9	31		
2008	0.1	0.5	0.6	0.1	0.4	0.0	0.1	0.1	0.0	0.1	2.1	15	1.1	49
2009	0.0	0.4	1.7	0.1	0.6	0.1	0.0	0.0	0.0	0.1	3.1	26	2.3	16
2010	0.2	1.0	1.8	0.2	0.7	0.2	0.2	0.1	0.1	0.2	4.5	12	2.9	24
2011	-	0.9	1.8	0.2	0.9	0.1	0.2	0.1	0.0	0.1	4.4	14	2.3	32
2012	-	0.8	1.0	0.1	0.7	0.1	0.1	0.2	0.1	0.2	3.2	15	2.9	27

Table 13. Spotted wolffish (*Anarhichas minor*). Biomass indices (tons) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year	0A	1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl	cv
1992		4	76	65	110	3	34	33	6	19	351	28		
1993		55	0	100	47	16	66	4	0	282	571	53		
1994		223	180	0	81	40	119	28	11	1	683	25		
1995		0	60	15	68	16	22	19	11	164	377	49		
1996		169	77	12	193	15	6	31	0	50	554	26		
1997		193	72	37	81	0	16	124	0	5	530	34		
1998		2	64	0	143	18	6	125	100	7	465	32		
1999		131	121	23	28	36	13	2	0	0	354	31		
2000		0	188	31	133	36	19	1	593	0	1000	114		
2001		523	30	25	310	80	4	0	0	10	982	52		
2002		135	194	20	169	81	74	233	71	126	1104	28		
2003		299	1416	195	978	22	741	107	0	226	3985	22		
2004		124	1270	623	567	2	78	603	352	545	4164	35		
New survey gear introduced														
2005	150	764	1182	6	1058	155	741	2514	568	137	7275	26		
2006	0	472	1257	243	1345	1066	1336	716	350	1145	7930	19		
2007	14	543	705	196	1249	678	874	372	178	634	5442	17		
2008	63	1487	2050	74	730	24	347	995	425	372	6567	44	5262	49
2009	0	280	627	653	1453	154	35	129	189	160	3662	18	2890	27
2010	66	2363	1508	1195	1006	167	222	238	212	1715	8691	18	3877	36
2011	-	2537	2244	742	2460	1210	2294	479	218	769	12955	23	6133	28
2012	-	1227	683	464	3166	325	468	390	555	1104	8383	21	6871	30

Table 14. Thorny skate (*Amblyraja radiata*). Abundance indices in millions for West Greenland with 95% confidence limits in percent of the stratified mean.

Year		1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl	cv
1992		2.9	1.3	1.3	1.4	0.2	0.6	1.0	0.1	0.0	9.0	25		
1993		0.7	0.4	0.8	1.6	0.5	0.9	0.5	0.6	0.2	6.1	21		
1994		1.9	1.8	1.2	3.9	1.8	2.8	0.4	0.2	0.0	14.1	21		
1995		2.7	1.3	0.8	2.8	1.8	0.7	2.4	0.5	0.1	13.1	26		
1996		4.6	2.2	1.5	4.0	0.4	0.7	0.6	0.0	0.6	14.6	23		
1997		4.6	1.4	0.6	4.4	0.2	2.3	0.7	0.1	0.0	14.4	26		
1998		2.8	4.1	3.2	3.0	0.3	0.6	0.9	0.4	0.3	15.5	25		
1999		1.7	3.2	0.9	2.8	0.3	1.0	0.8	0.2	0.2	11.0	23		
2000		2.1	3.4	2.0	4.0	0.5	0.6	0.5	0.1	0.6	13.9	23		
2001		3.2	1.2	0.6	2.3	0.3	0.4	0.5	0.1	0.2	8.8	32		
2002		0.5	1.1	0.9	2.2	0.4	0.9	2.6	0.2	0.5	9.3	25		
2003		3.9	2.4	1.4	7.2	0.1	0.7	0.8	0.2	0.7	17.4	26		
2004		2.5	1.3	1.3	1.2	0.2	0.2	0.7	0.2	0.1	7.9	24		
New survey gear introduced														
2005	0.1	4.1	2.8	2.2	3.7	0.5	0.8	0.6	0.4	0.2	15.4	10		
2006	0.2	3.8	2.2	3.0	2.8	0.2	2.3	2.8	0.5	1.1	18.8	10		
2007	0.1	3.3	1.4	1.6	3.8	0.1	1.3	0.9	1.4	0.4	14.3	20		
2008	0.2	5.4	1.4	1.0	1.9	0.1	0.5	1.1	0.1	0.2	11.9	16	0.7	49
2009	0.0	10.9	1.1	3.9	1.9	0.3	0.3	0.6	0.2	0.4	19.7	20	2.3	15
2010	0.1	5.6	4.0	4.1	3.3	0.8	2.7	1.2	0.1	0.0	21.8	12	2.9	23
2011	-	5.5	2.3	3.6	6.7	0.4	4.0	4.9	1.7	0.1	29.2	16	2.2	21
2012	-	2.7	2.2	2.4	4.7	0.5	1.3	2.1	0.1	0.0	16.1	15	1.8	26

Table 15. Thorny skate (*Amblyraja radiata*). Biomass (tons) for West Greenland with 95% confidence limits in percent of the stratified mean.

Year		1AN	1AS	1AX	1BN	1BS	1C	1D	1E	1F	W-Grl	cv	E-Grl	cv
1992		370	268	162	226	37	57	113	32	5	1271	20		
1993		60	65	199	171	87	116	128	40	22	887	24		
1994		494	283	182	465	275	311	55	61	3	2129	23		
1995		253	227	301	451	327	121	300	78	24	2083	21		
1996		631	554	623	509	61	105	65	0	207	2755	23		
1997		830	411	322	566	56	156	187	25	7	2559	26		
1998		392	839	535	427	78	38	114	81	76	2580	26		
1999		278	931	253	247	45	94	96	25	49	2019	34		
2000		323	1178	345	428	122	84	120	3	197	2799	23		
2001		325	215	222	248	52	52	89	10	60	1272	28		
2002		13	246	320	280	101	86	687	63	177	1973	29		
2003		1005	902	567	1481	11	107	174	24	206	4478	25		
2004		598	520	791	197	47	33	333	98	78	2694	23		
New survey gear introduced														
2005	26	776	953	676	558	219	145	249	125	96	3822	15		
2006	66	836	364	662	361	91	477	807	224	303	4193	14		
2007	55	897	319	566	709	50	258	152	164	87	3258	15		
2008	98	1411	315	400	353	20	45	222	25	47	2937	21	646	49
2009	7	2267	411	904	374	90	81	97	78	55	4365	11	1615	16
2010	20	1092	1036	1062	623	293	434	368	16	19	4962	11	2397	29
2011	-	970	556	1129	1152	84	477	1172	80	42	5661	11	1925	22
2012	-	738	635	722	910	107	192	145	31	16	3496	12	1546	27

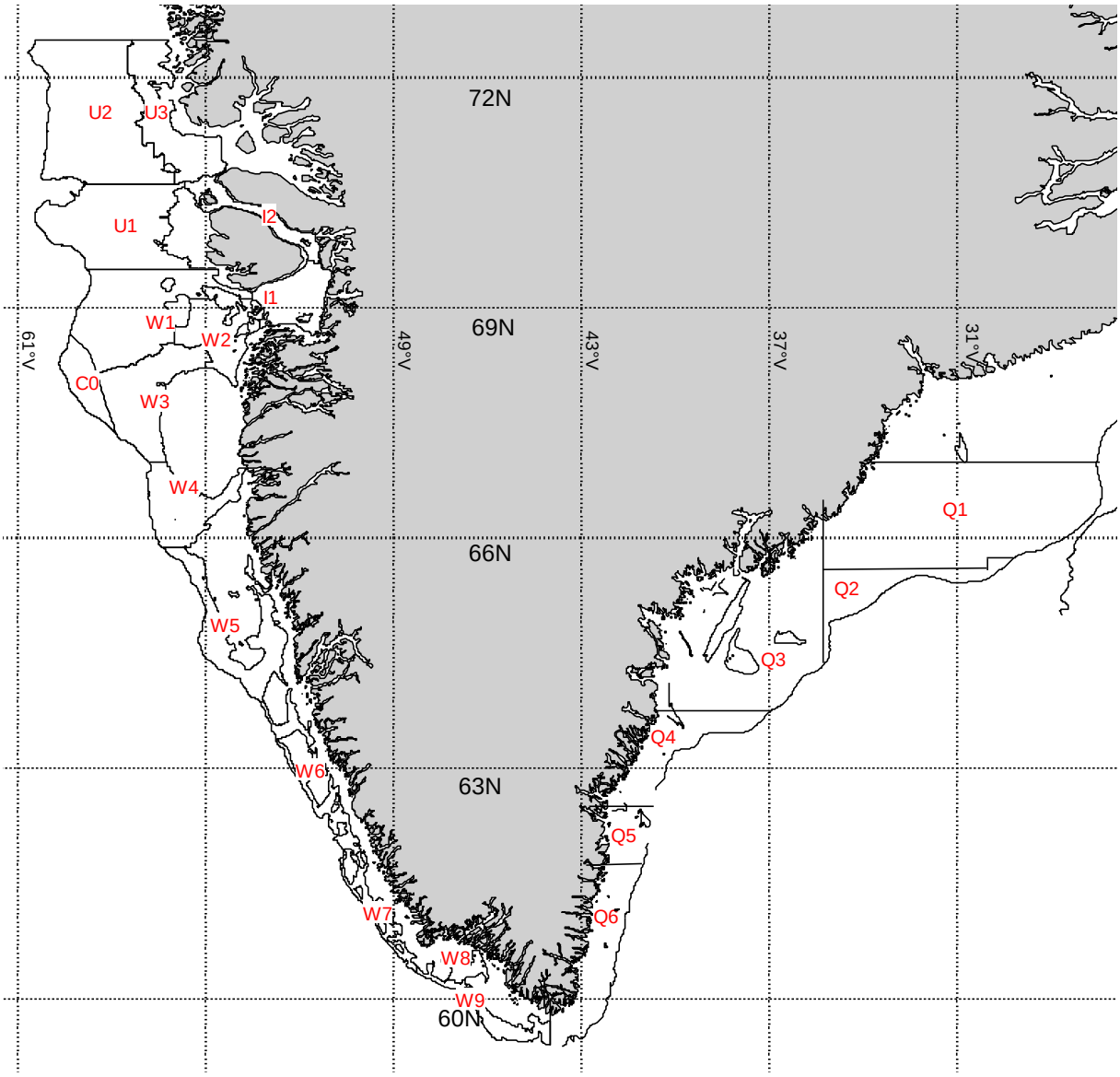

Fig 1: The Stratification areas used in the Greenland Shrimp and Fish survey. In West Greenland each strata is divided in depth strata of 150-200m, 200-300m, 300-400m and 400-600m. "Shallow" water strata of 0-100m and 100-150m delimited by the 3 nm line and the NAFO Div. Borders of the shallow water stratas are not shown. In East Greenland each strata is divided in depth strata of 200-400m and 400-600m. "Shallow" water strata of 0-200m is delimited by the 3 nm line.

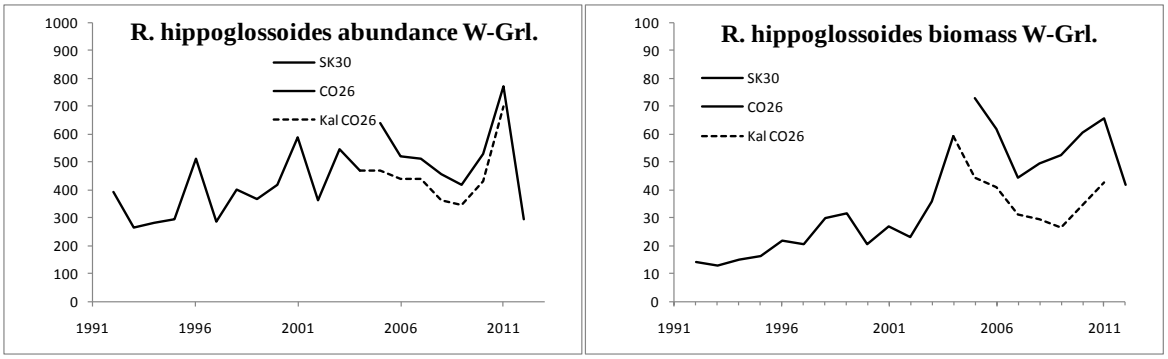

Fig 2. Greenland halibut Abundance (millions) and biomass (tons) for Westgreenland.

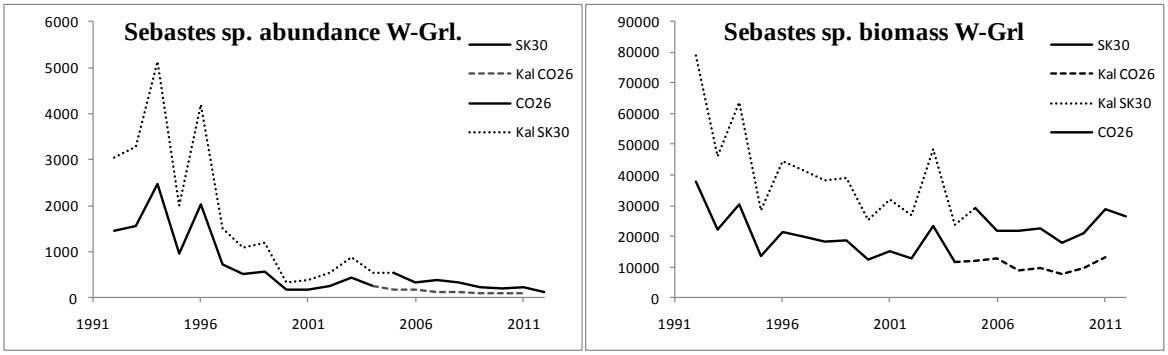

Fig 3. Redfish species combined Abundance (millions) and Biomass (tons) indices for Westgreenland.

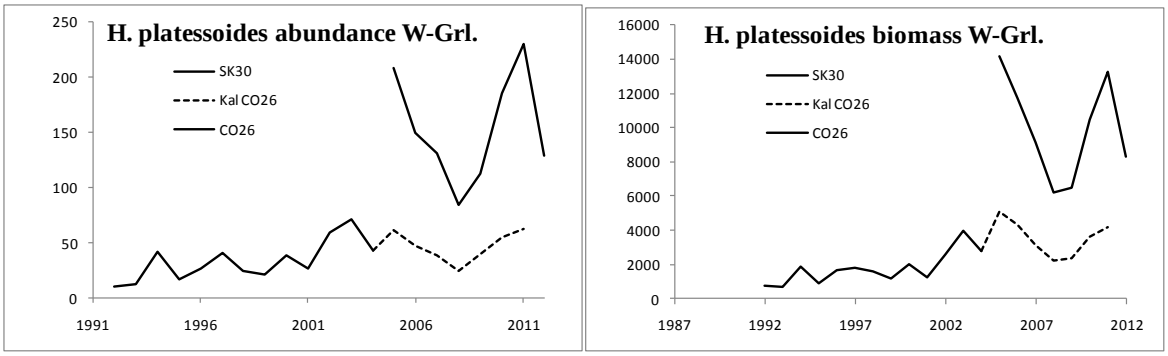

Fig 4. American plaice Abundance (millions) and Biomass (tons) indices for Westgreenland.

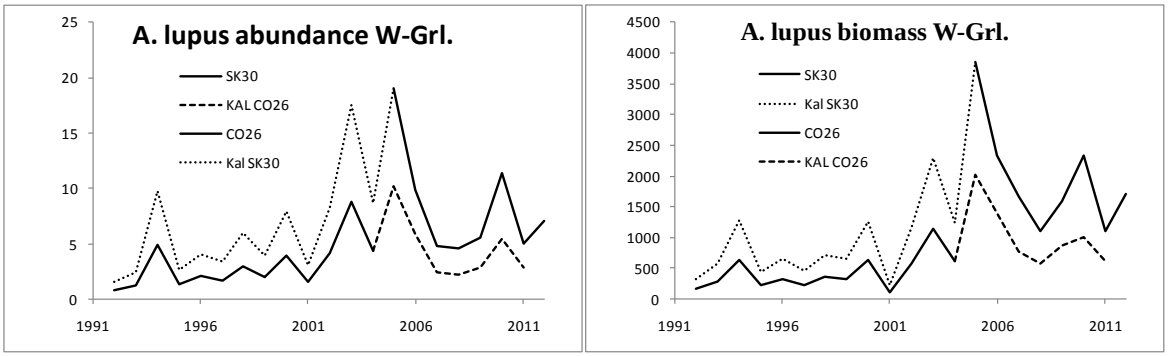

Fig 5. Atlantic wolffish abundance (millions) and biomass (tons) indices for Westgreenland.

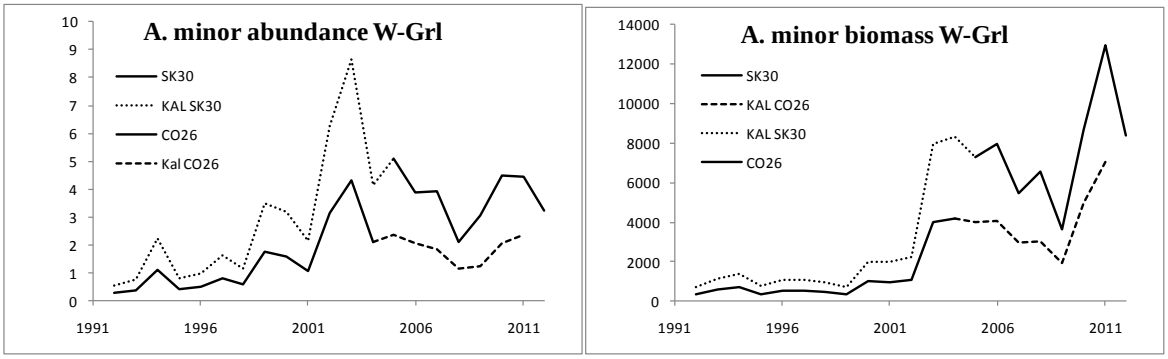

Fig 6. Spotted wolffish abundance (millions) and biomass (tons) indices for Westgreenland.

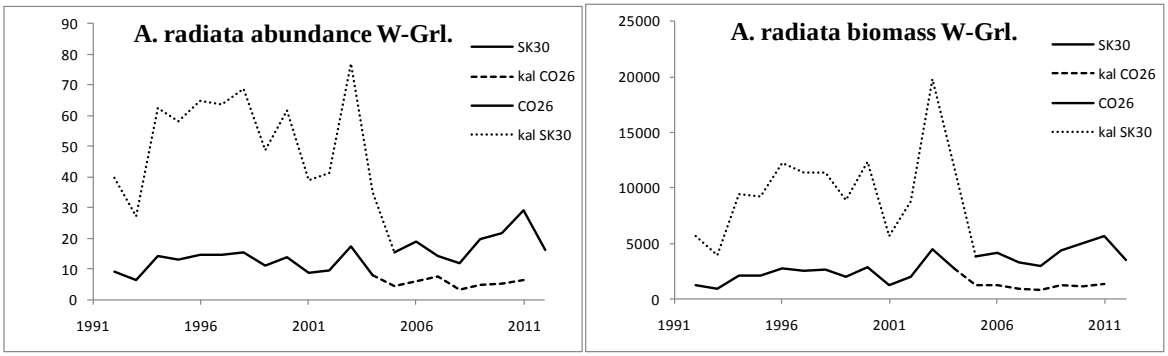

Fig 7. Thorny skate abundance (millions) and biomass (tons) indices for Westgreenland.

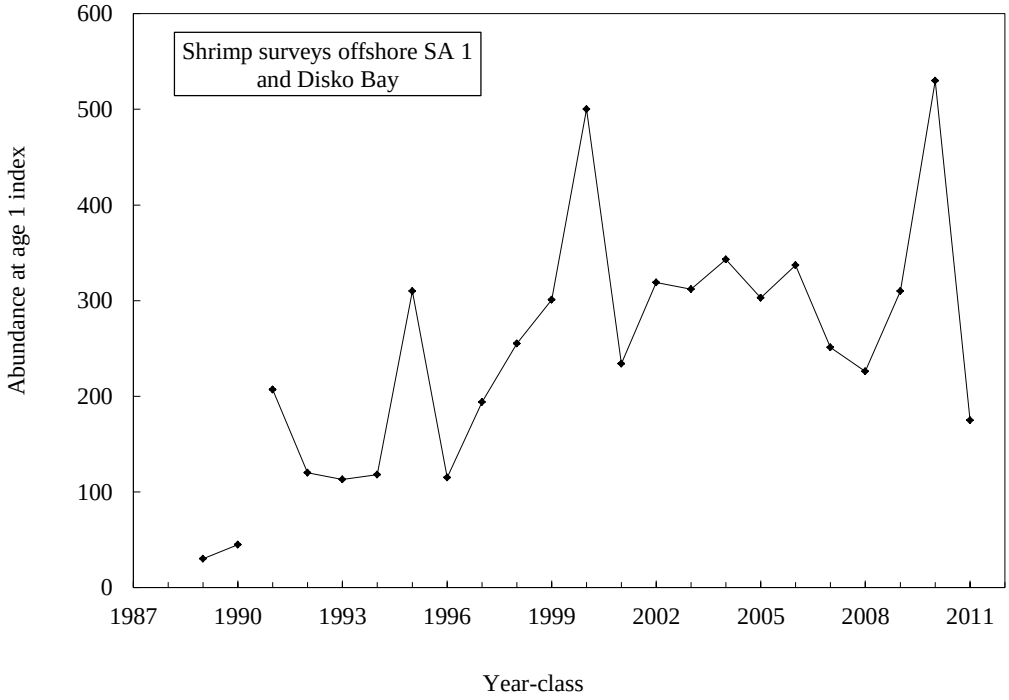

Fig 8a. Total recruitment of age one including Disko Bay.

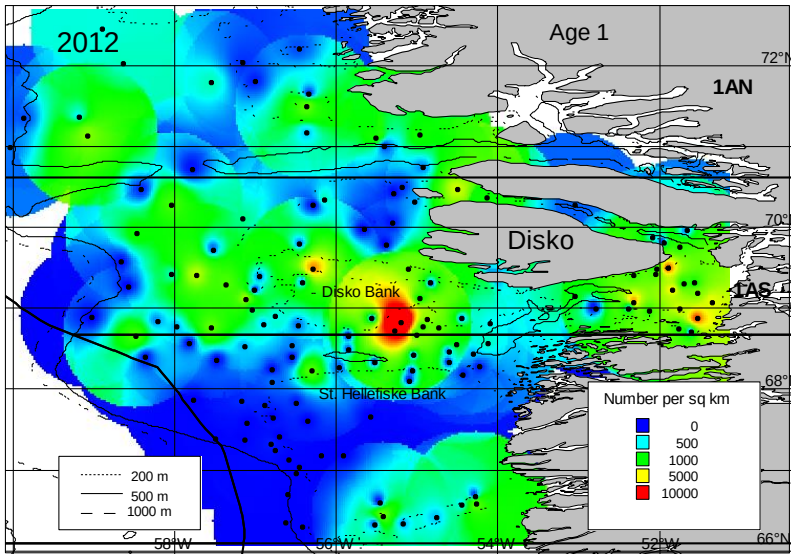

Fig 8b. Distribution of ne year old Greenland halibut (2011 year-class) in the 2012 survey.

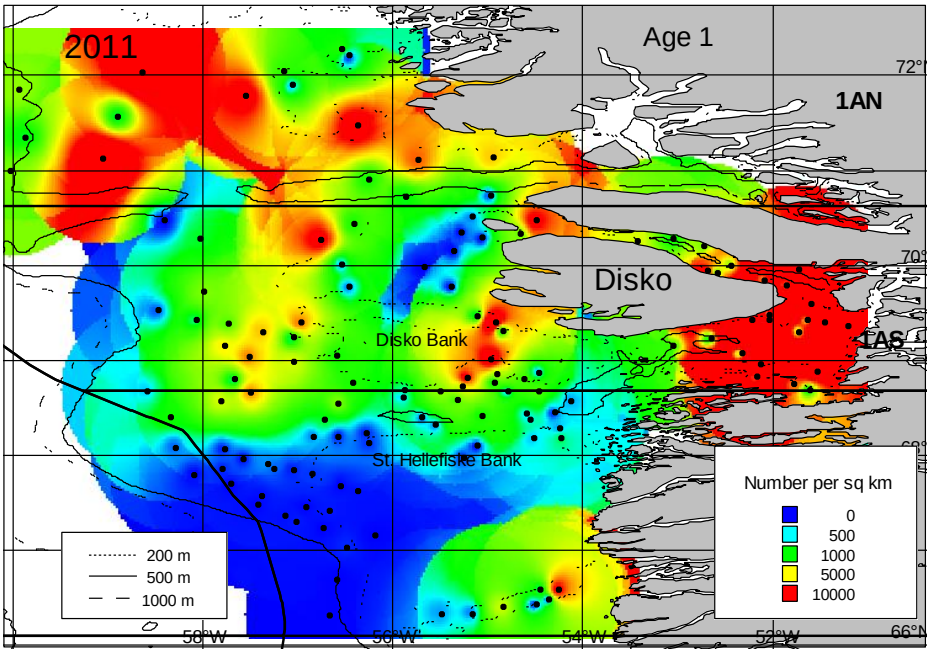

Fig 8c. Distribution of one year old Greenland halibut (2010 year-class) in the 2011 survey.

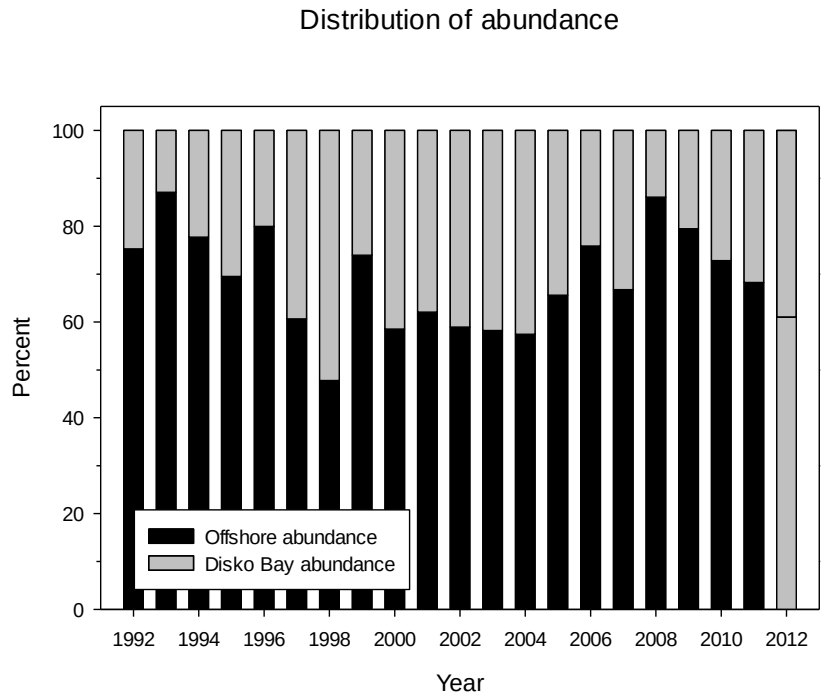

Fig 8d. Relative distribution of one-year old Greenland halibut between offshore areas and inshore Disko Bay.

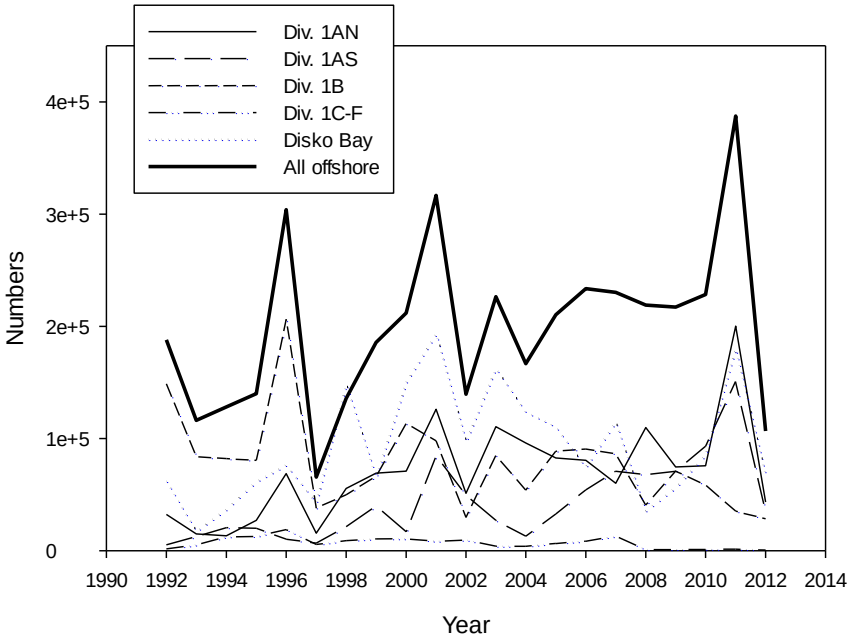

Fig. 8e. Number of one-year of Greenland halibut by division and year.

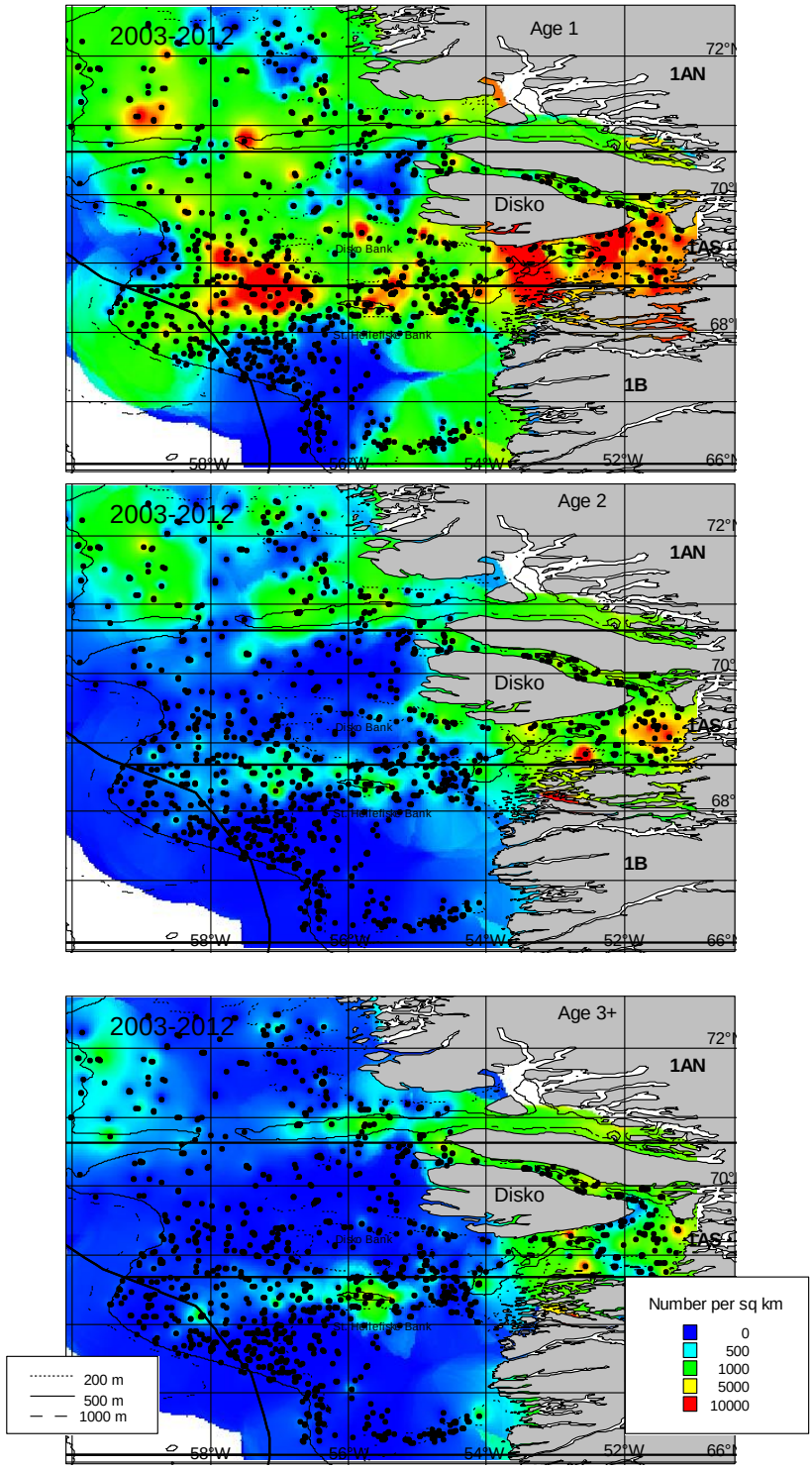

Fig 8f. Distribution of 1-year, 2-year and 3+ old Greenland halibut. Data from 2003-2012 pooled.

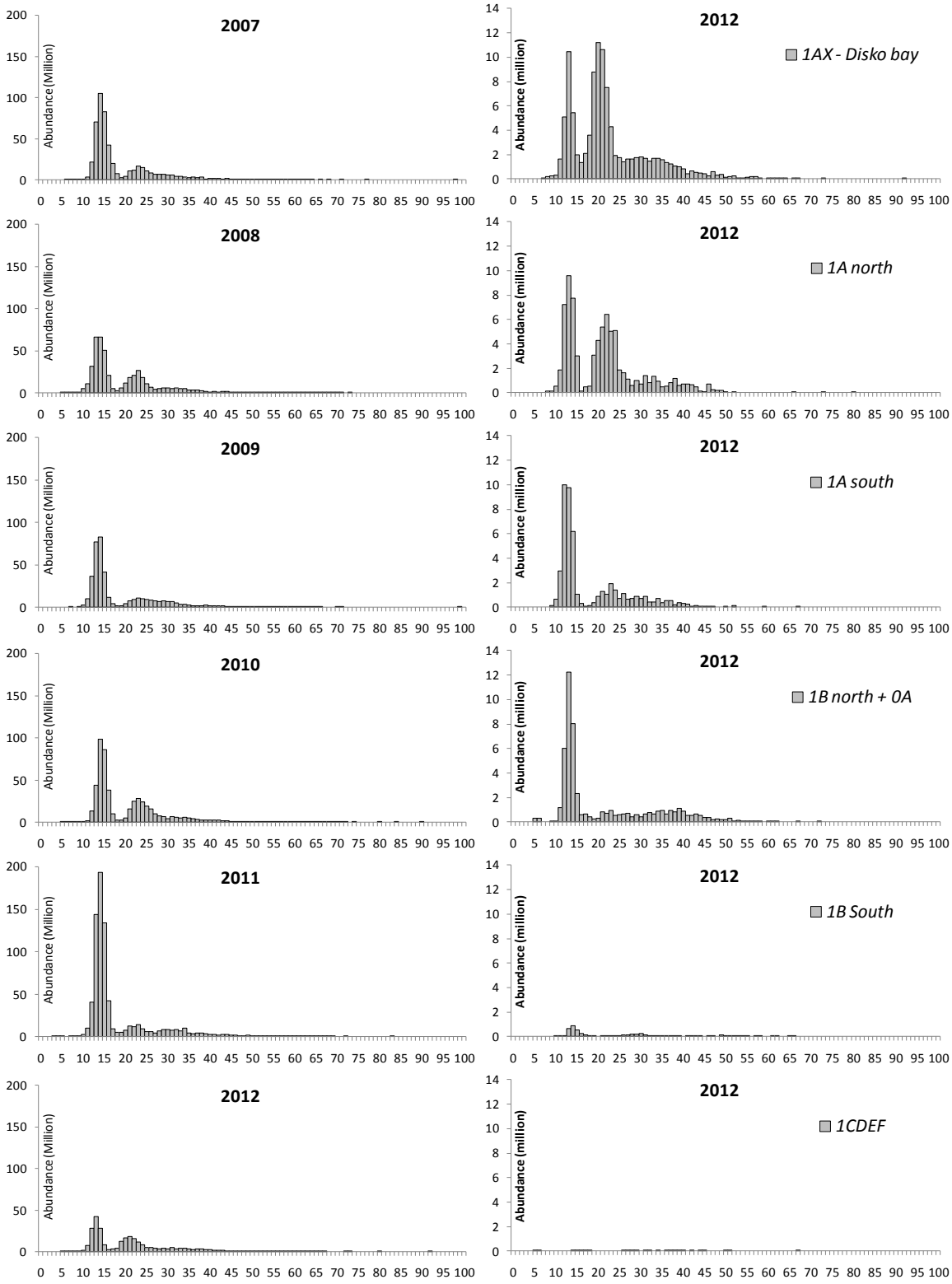

Fig. 9. Greenland halibut (*Reinhardtius hippoglossoides*). Length frequencies for West Greenland 2007-2012 (left) and length frequencies per division in 2012 (right).

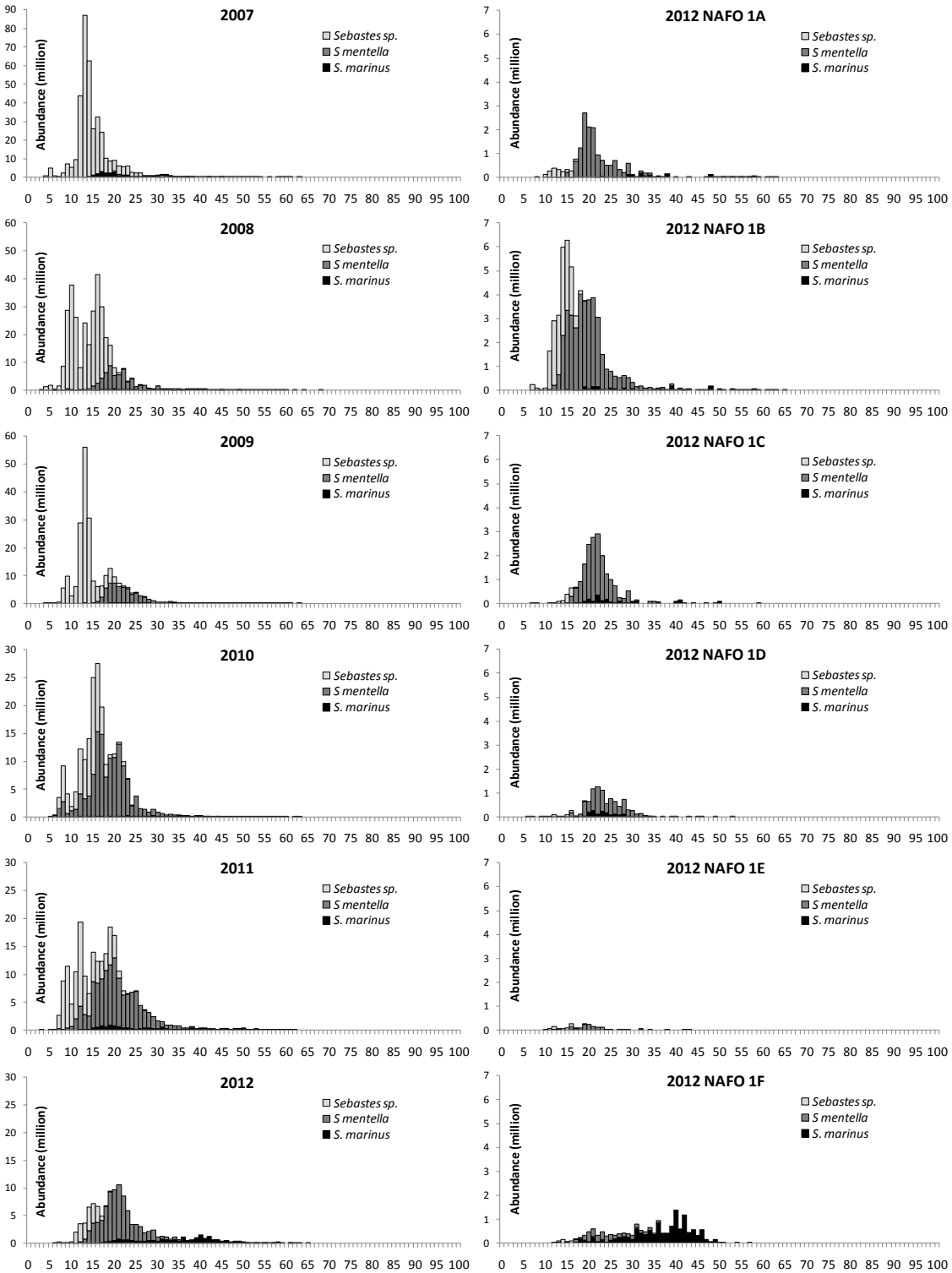

Fig. 10. Stacked Length frequencies for golden redfish (*Sebastes Marinus*), Deep-sea redfish (Sebastes mentella) and juvenile redfish (Sebastes sp.) for West Greenland 2007-2012 (left) and length frequencies per division in 2012 (right).

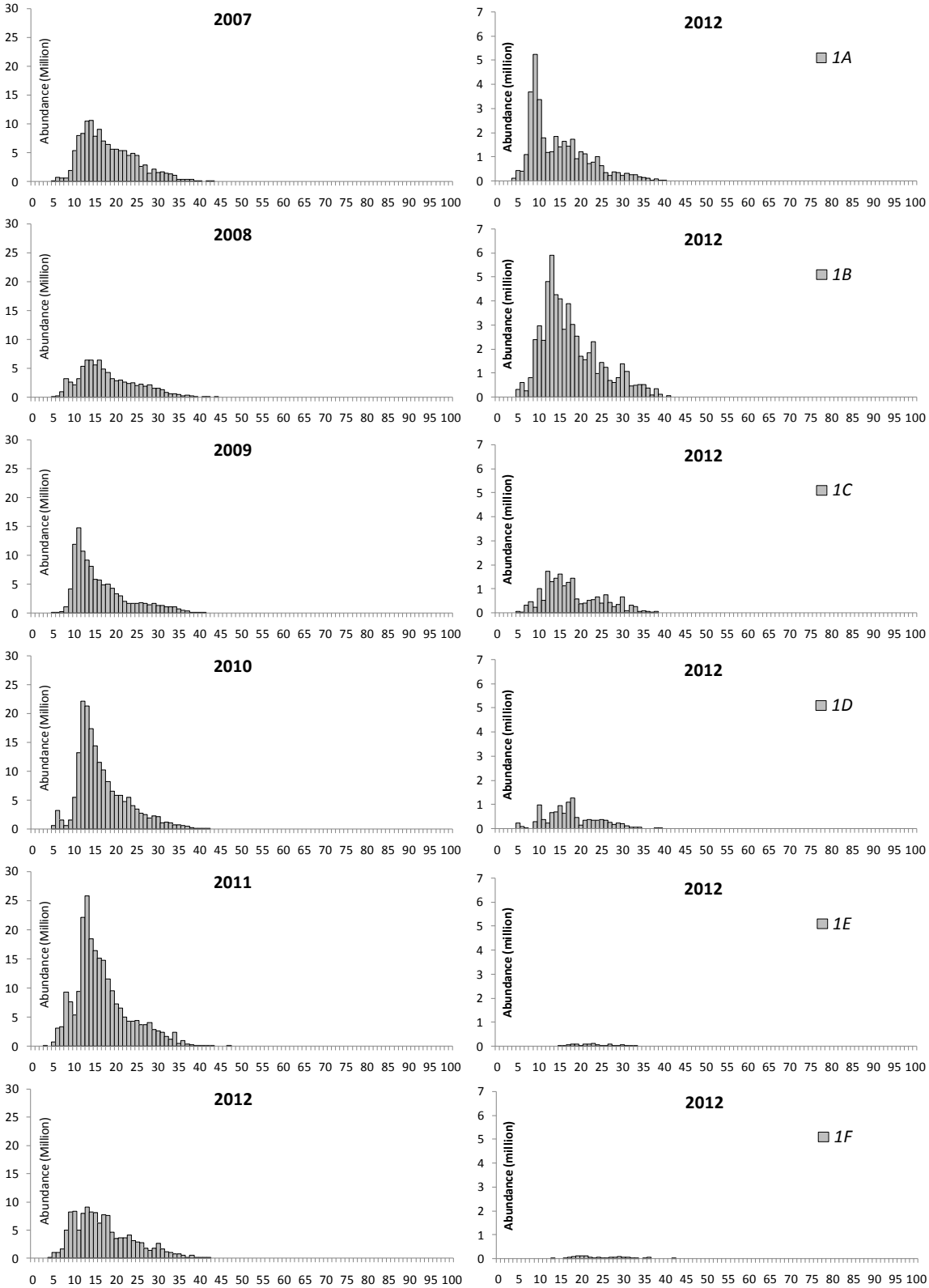

Fig. 11. American place (*Hippoglossoides platessoides*). Length frequencies for West Greenland 2007-2012 (left) and length frequencies per division in 2012 (right).

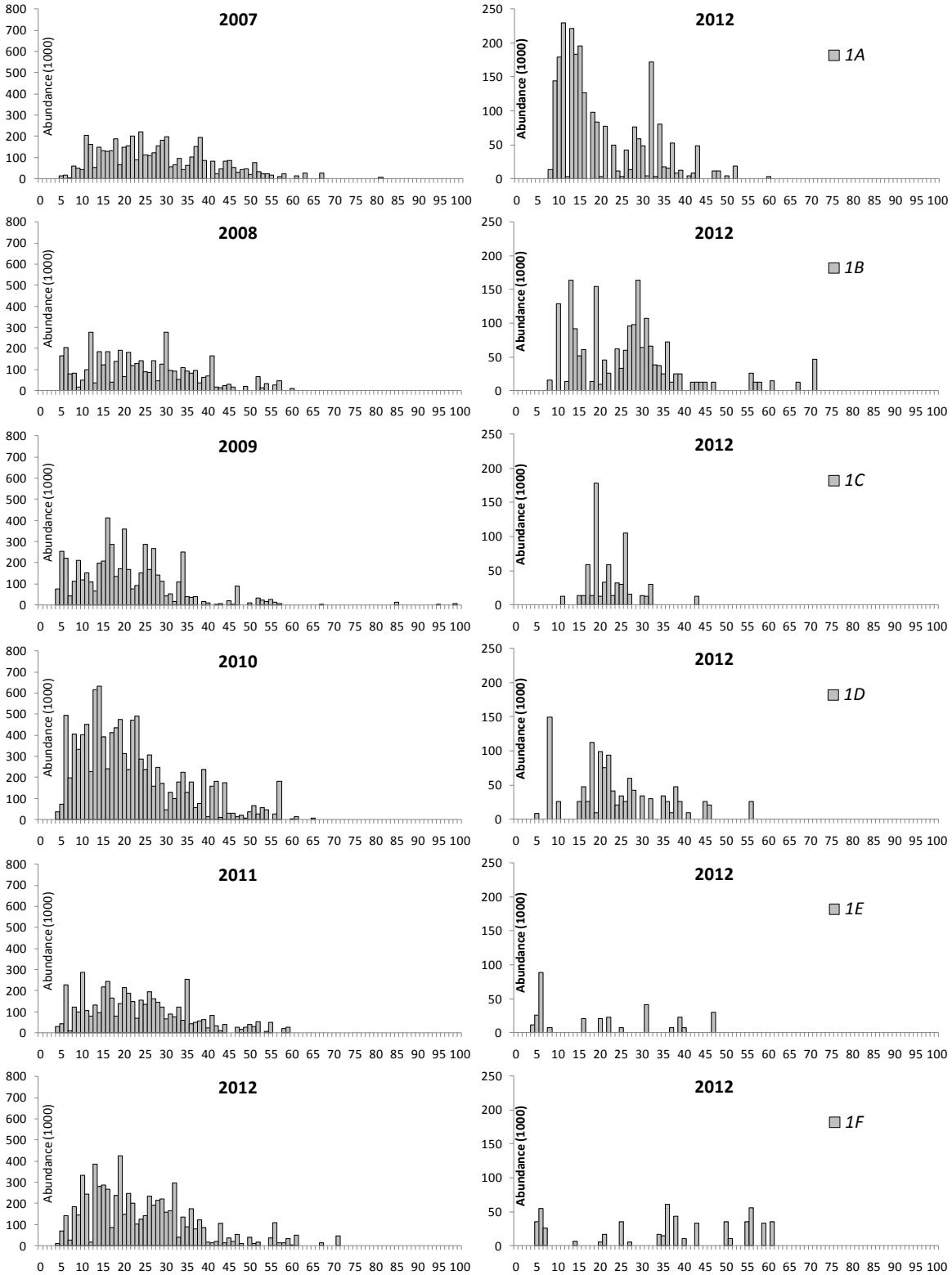

Fig. 12. Atlantic wolfish (*Anarhichas lupus*). Length frequencies for West Greenland 2007-2012 (left) and length frequencies per division in 2012 (right).

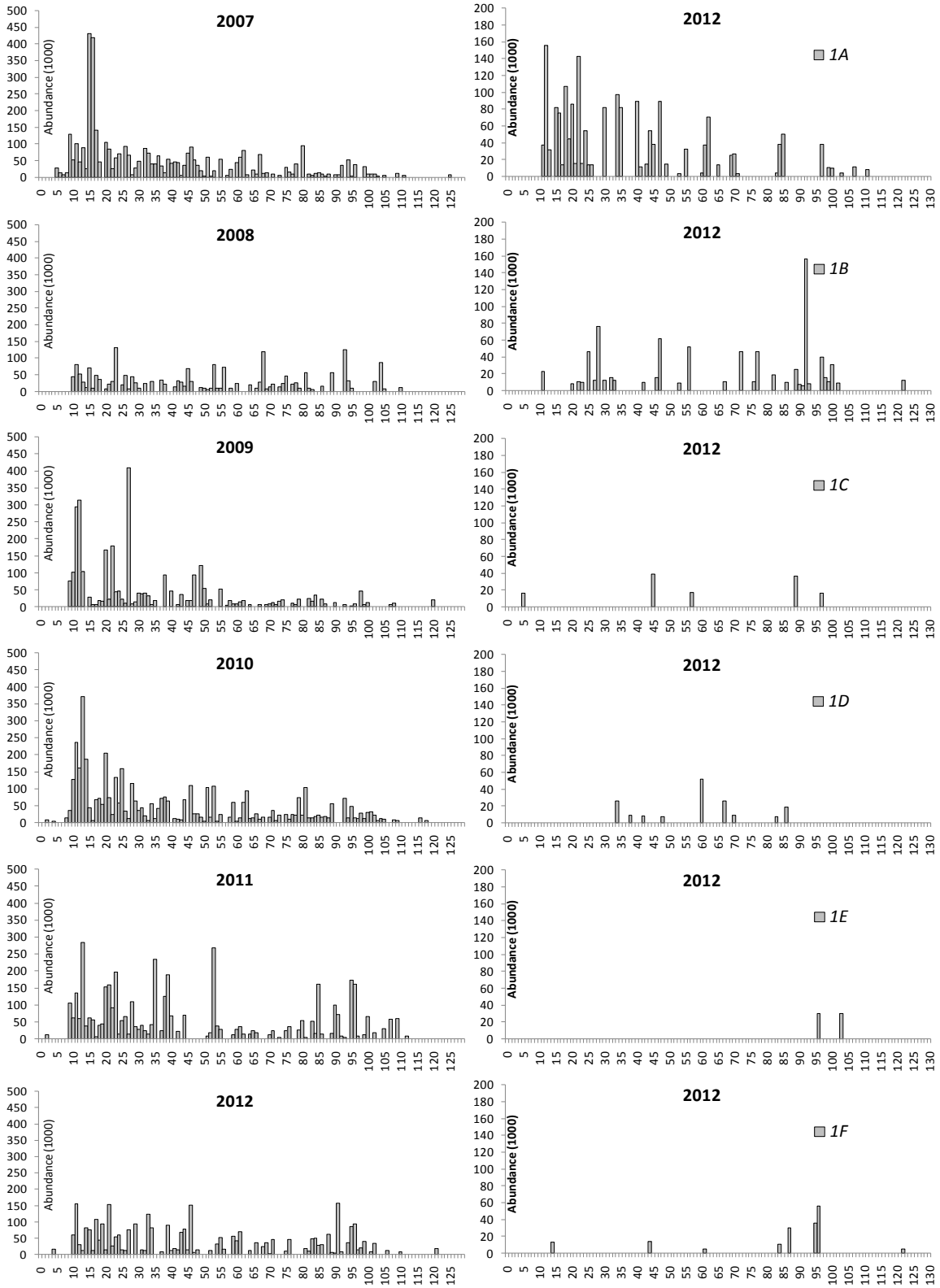

Fig. 13. Spotted wolfish (*Anarhichas lupus*). Length frequencies for West Greenland 2007-2012 (left) and length frequencies per division in 2012 (right).

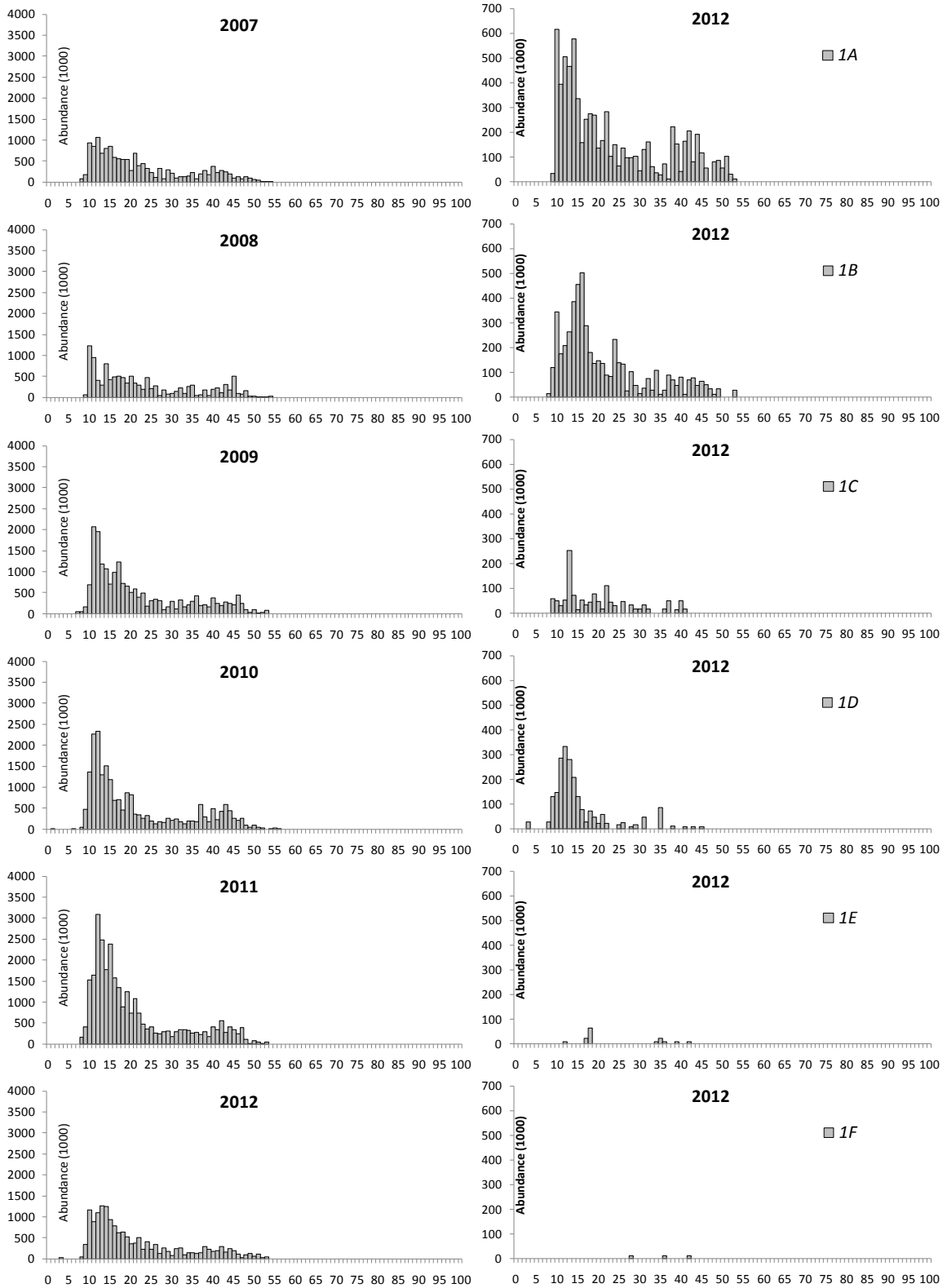

Fig. 14. Thorny skate (*Amblyraja radiata*) length frequencies for West Greenland 2007-2012 (left) and length frequencies per division in 2012 (right).

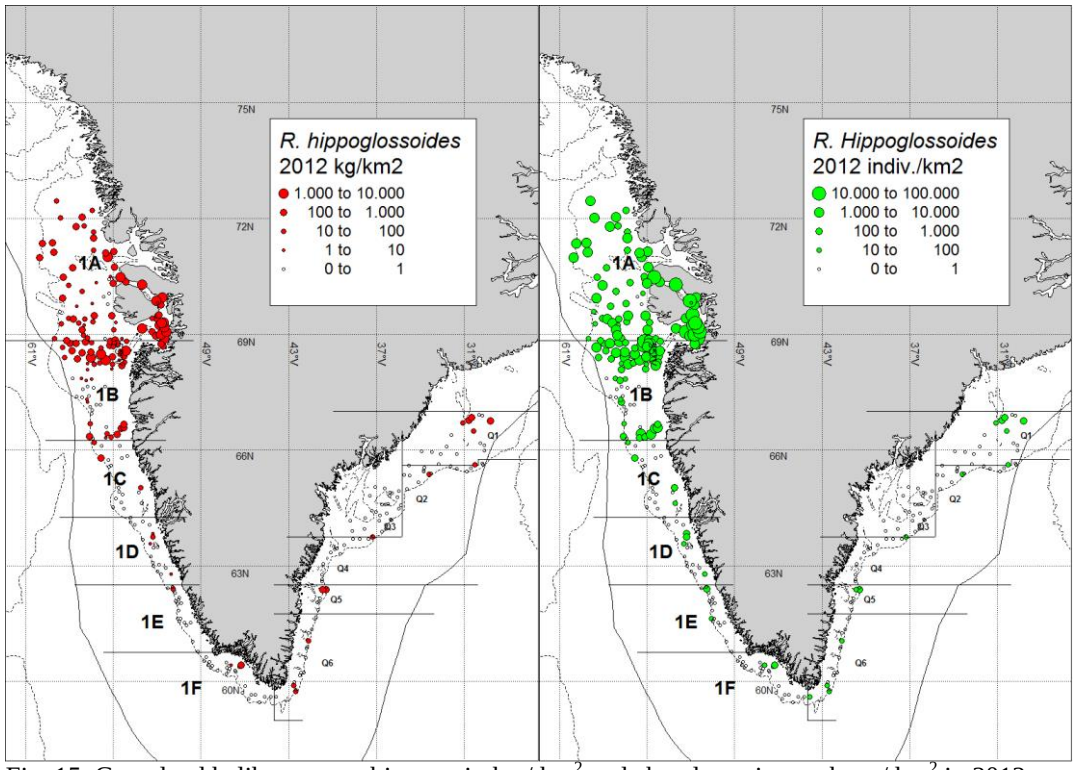

Fig. 15. Greenland halibut survey biomass in kg / km^2 and abundance in numbers / km^2 in 2012.

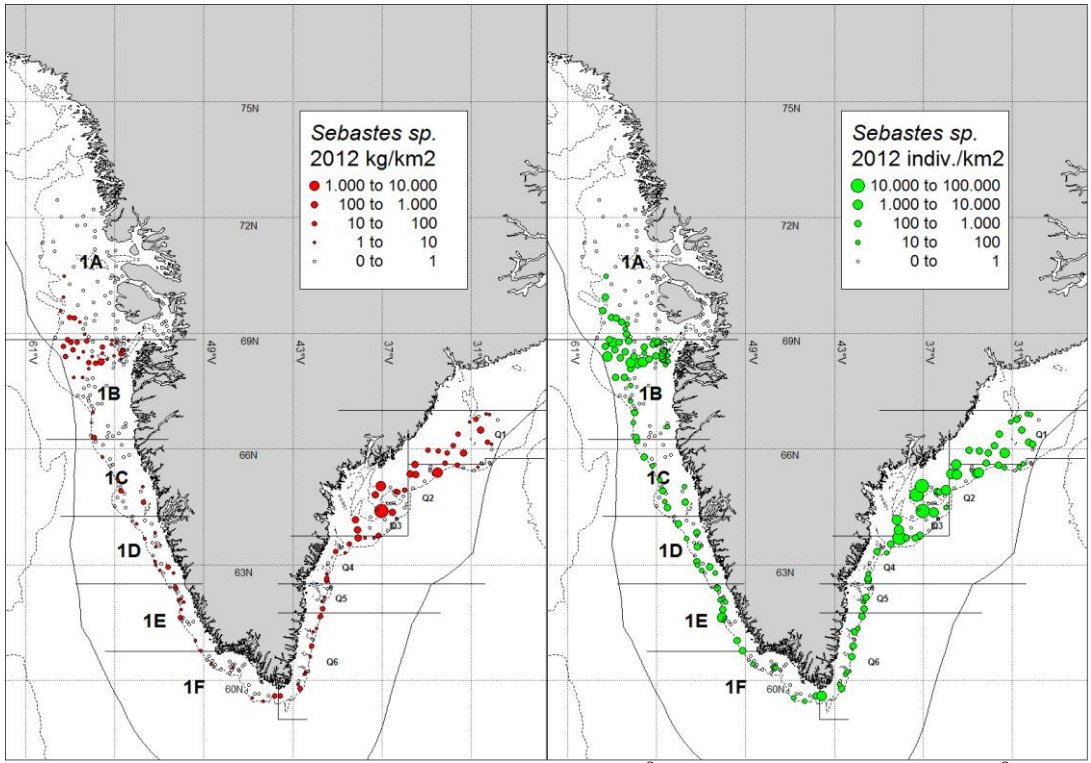

Fig. 16. Juvenile redfish < 20 cm survey biomass in kg / km^2 and abundance in numbers / km^2 in 2012.

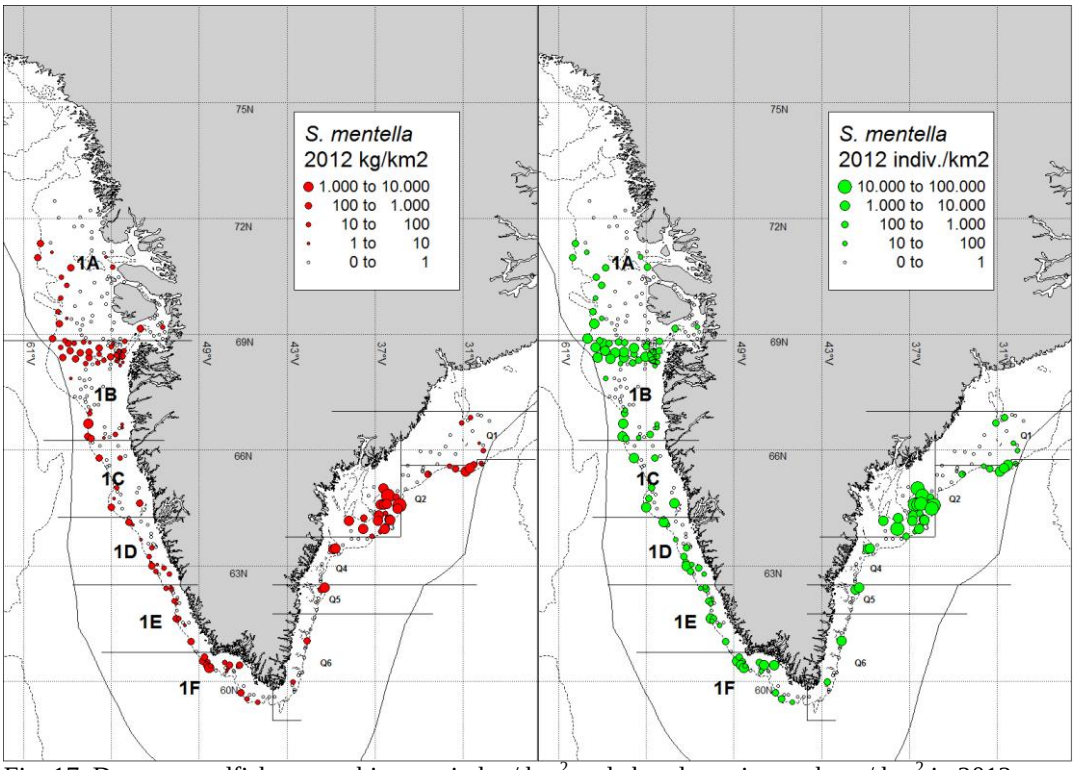

Fig. 17. Deep-sea redfish survey biomass in kg / km^2 and abundance in numbers / km^2 in 2012.

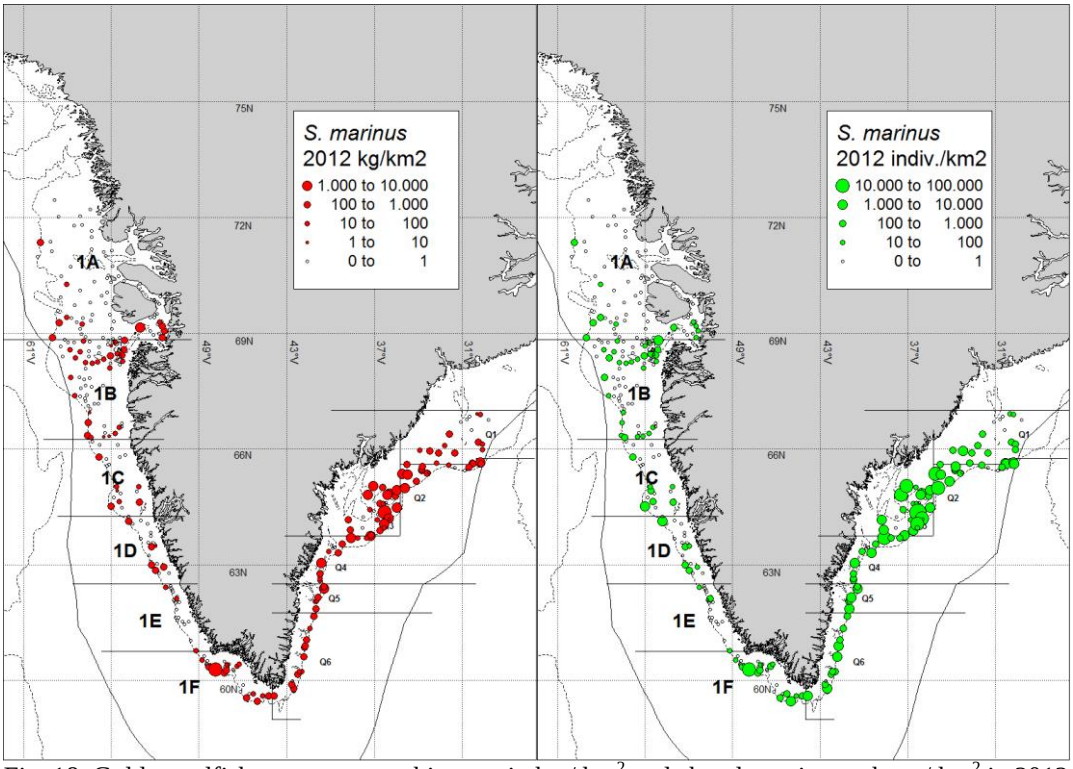

Fig. 18. Golden redfish survey survey biomass in kg / km^2 and abundance in numbers / km^2 in 2012.

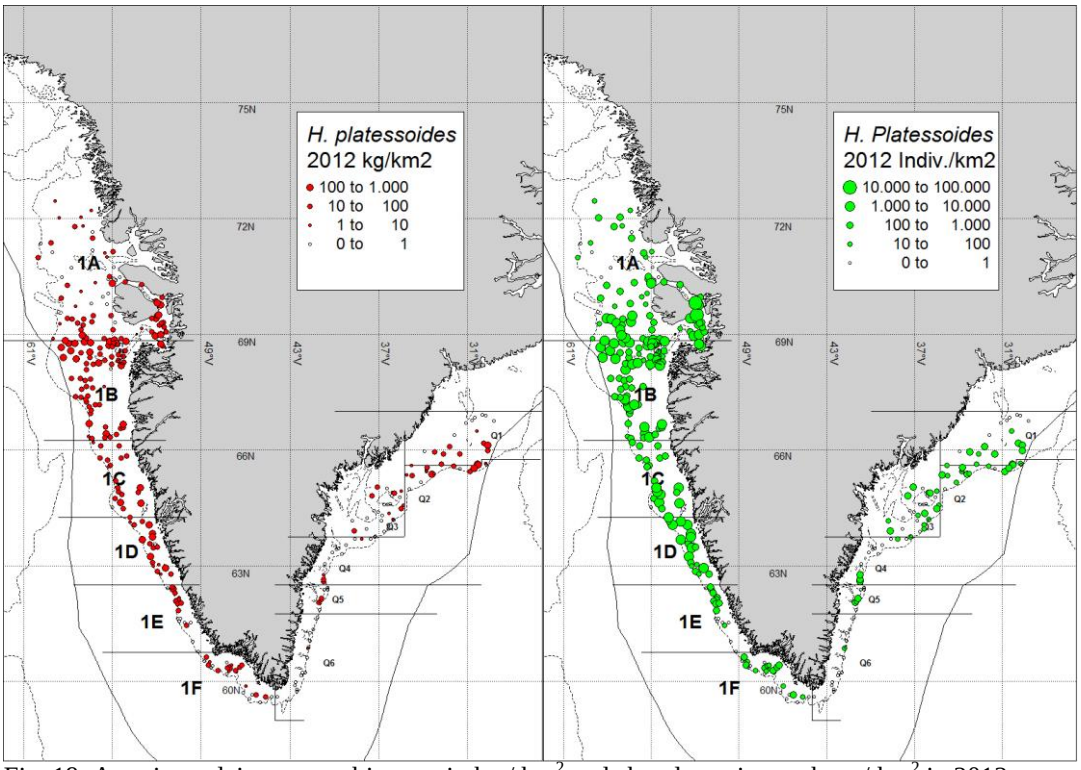

Fig. 19. American plaice survey biomass in kg / km^2 and abundance in numbers / km^2 in 2012.

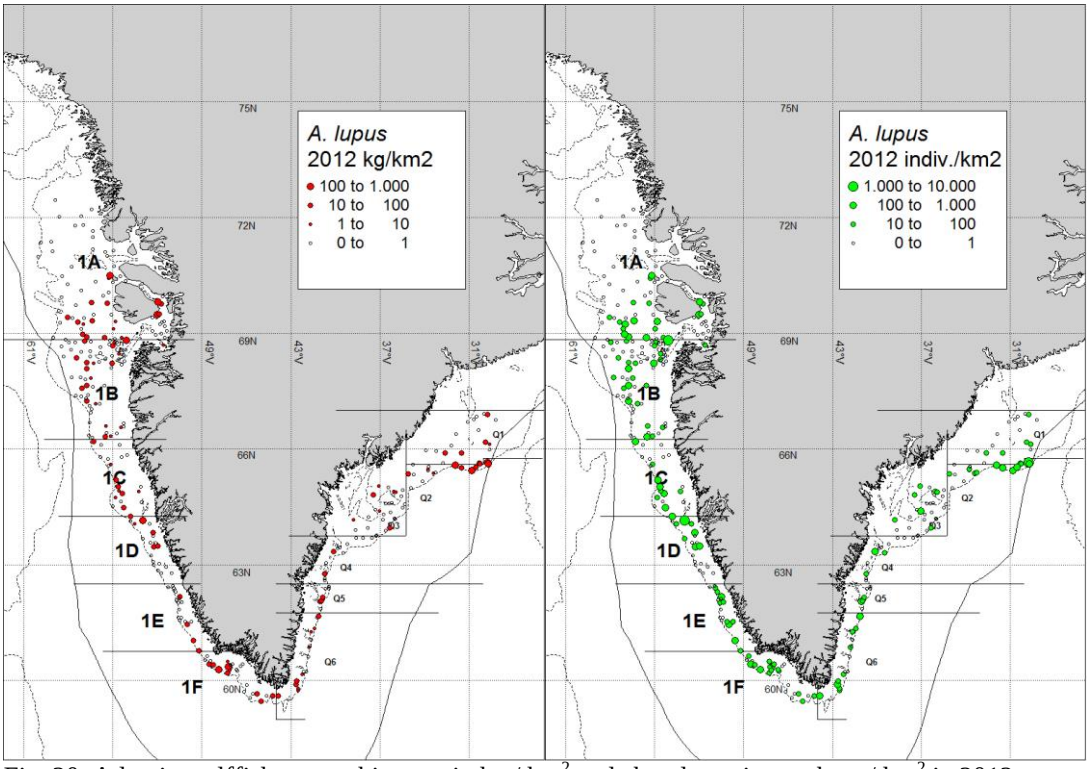

Fig. 20. Atlantic wolffish survey biomass in kg / km^2 and abundance in numbers / km^2 in 2012.

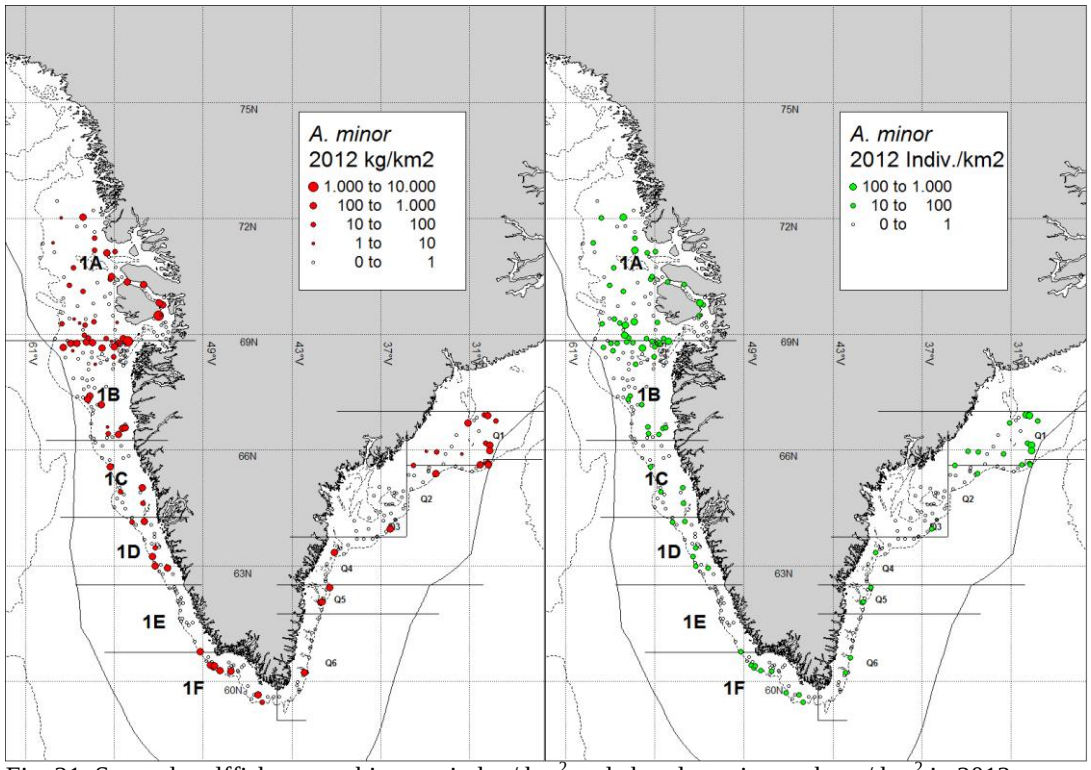

Fig. 21. Spotted wolffish survey biomass in kg / km^2 and abundance in numbers / km^2 in 2012.

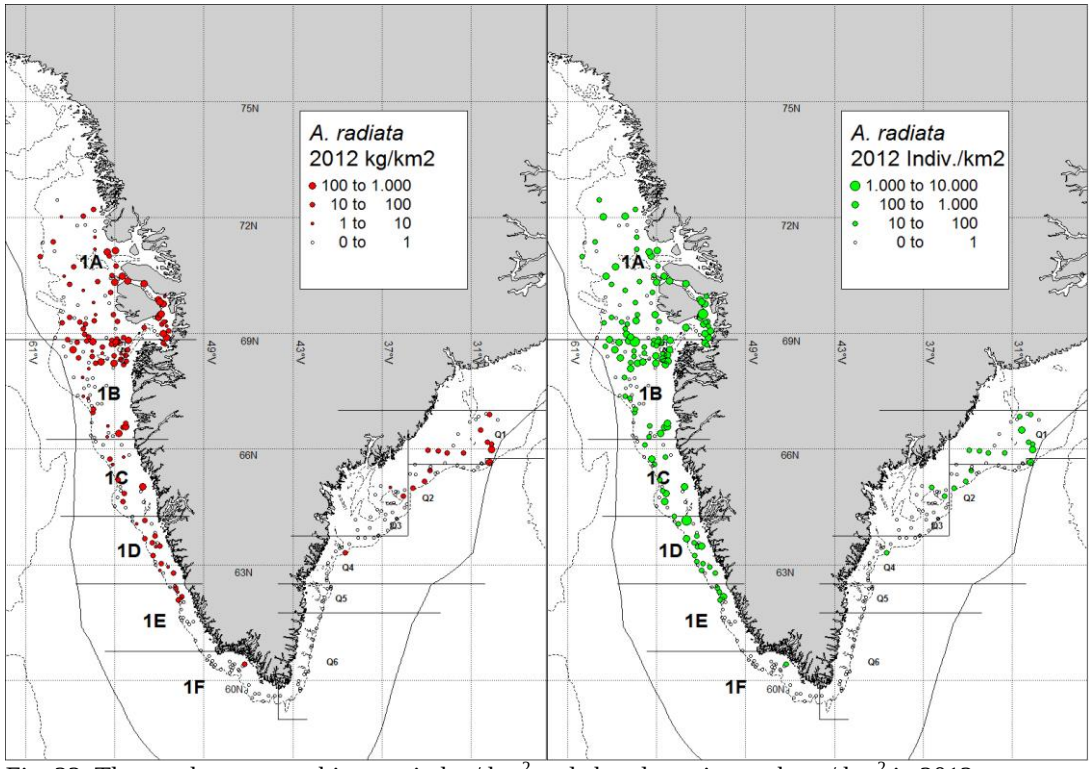

Fig. 22. Thorny skate survey biomass in kg / km^2 and abundance in numbers / km^2 in 2012.

Appendix I.

2012 biomass (in kilotons) and abundance (in million individuals) indices for Elasmobranchs, Teleosts, Cephalopods and crustaceans excl. Shrimp species for the West and East-Greenland part of the GINR shrimp fish survey 0-600m including the West-Greenlandic Shelf part of NAFO div 0A (Canada).

Species	*NameLatin*	West Mio.	East Mio.	Total Mio.	West KT	East KT	Total KT
REG	*Sebastes marinus*	19,78	459,54	479,32	14,61	97,74	112,35
REB	*Sebastes mentella*	79,23	305,47	384,69	11,20	100,34	111,54
COD	*Gadus morhua*	71,12	22,68	93,79	37,10	64,42	101,52
GSK	*Somniosus microcephalus*	0,11	0,00	0,11	71,49	0,00	71,49
GHL	*Reinhardtius hippoglossoides*	292,94	1,65	294,59	41,81	2,44	44,25
RED	*Sebastes sp.*	20,78	253,34	274,12	0,70	36,57	37,27
POC	*Boreogadus saida*	3564,54	108,69	3673,23	30,03	1,37	31,40
CAS	*Anarhichas minor*	3,22	2,86	6,08	8,38	6,87	15,25
CAD	*Anarhichas denticulatus*	1,12	1,77	2,89	3,83	11,26	15,09
WHB	*Micromesistius poutassou*	27,43	109,75	137,18	1,60	9,91	11,51
PLA	*Hippoglossoides platessoides*	129,38	10,41	139,79	8,32	2,70	11,02
RRD	*Raja radiata*	16,08	1,83	17,90	3,50	1,55	5,04
CAA	*Anarhichas lupus*	7,01	3,78	10,80	1,71	1,17	2,88
MSC	*Myoxocephalus scorpius*	6,38	0,00	6,38	2,63	0,00	2,63
BLI	*Molva dipterygius*	0,05	1,69	1,74	0,04	2,45	2,49
ARS	*Argentina silus*	11,12	19,71	30,83	0,14	2,35	2,48
NOK	*Notoscopelus kroeyeri*	64,83	18,07	82,90	0,93	0,29	1,22
CAP	*Mallotus villosus*	77,30	28,13	105,43	0,73	0,33	1,07
USK	*Brosme brosme*	0,03	0,91	0,94	0,03	0,97	1,00
RHG	*Macrourus berglax*	0,10	0,81	0,91	0,06	0,85	0,92
AMD	*Ammodytes dubius*	120,25	0,00	120,25	0,78	0,00	0,78
GRC	*Gadus ogac*	1,73	0,00	1,73	0,77	0,00	0,77
TRN	*Triglops nybelini*	68,29	1,13	69,42	0,74	0,01	0,75
ELZ	*Lycodes sp.*	13,01	0,23	13,24	0,59	0,00	0,59
LUM	*Cyclopterus lumpus*	0,39	0,03	0,42	0,52	0,05	0,57
LEM	*Leptoclinus maculatus*	184,10	0,00	184,10	0,53	0,00	0,53
BEG	*Benthosema glaciale*	219,75	7,25	227,00	0,41	0,01	0,42
LYN	*Lycodes eudipleurostictus*	10,80	0,47	11,27	0,36	0,03	0,39
ARA	*Artediellus atlanticus*	11,39	14,06	25,45	0,15	0,23	0,38
RFL	*Raja fyllae*	0,06	0,84	0,89	0,01	0,36	0,37
LYV	*Lycodes vahlii*	5,28	0,86	6,14	0,30	0,05	0,35
EUM	*Eumicrotremus spinosus*	13,79	0,00	13,79	0,32	0,00	0,32
TRM	*Triglops murrayi*	4,25	8,59	12,85	0,06	0,26	0,32
GON	*Gonatus sp.*	26,86	3,80	30,66	0,19	0,03	0,22
ART	*Artediellus sp.*	10,70	0,00	10,70	0,19	0,00	0,19
LSE	*Lycodes seminudus*	2,78	0,12	2,90	0,14	0,02	0,16
LLA	*Lumpenus lampretaeformis*	7,97	0,00	7,97	0,14	0,00	0,14
GYT	*Gymnocanthus tricuspis*	1,24	0,00	1,24	0,12	0,00	0,12
GOF	*Gonatus fabricii*	0,85	0,00	0,85	0,11	0,00	0,11
RLT	*Dipterus linteus*	0,04	0,00	0,04	0,09	0,00	0,09
OPI	*Opisthoteuthis sp.*	0,00	0,04	0,04	0,00	0,09	0,09
MYP	*Myctophum punctatum*	7,24	3,06	10,30	0,06	0,03	0,09
RHB	*Raja hyperborea*	0,08	0,00	0,08	0,08	0,00	0,08
LYR	*Lycodes reticulatus*	0,04	0,46	0,50	0,03	0,03	0,06

HAD	*Melanogrammus aeglefinus*	0,78	0,62	1,41	0,04	0,02	0,06
EPR	*Eumesogrammus praecisus*	2,05	0,00	2,05	0,06	0,00	0,06
SPE	*Trisopterus esmarki*	0,00	1,32	1,32	0,00	0,05	0,05
CAT	*Anarhichas sp.*	0,01	0,00	0,01	0,05	0,00	0,05
HYS	*Hyas sp.*	6,82	0,00	6,82	0,05	0,00	0,05
CAR	*Careproctus reinhardti*	0,59	0,99	1,58	0,02	0,03	0,05
MYX	*Myxine glutinosa*	0,81	0,39	1,19	0,03	0,02	0,04
ONN	*Gaidropsarus ensis*	0,35	0,00	0,35	0,04	0,00	0,04
GSP	*Gonatus sp.*	2,22	0,18	2,40	0,04	0,00	0,04
LIF	*Liparis fabricii*	4,22	0,46	4,68	0,03	0,00	0,03
ROS	*Rossia sp.*	0,93	1,08	2,01	0,02	0,01	0,03
MAA	*Magnisudis atlantica*	0,58	0,00	0,58	0,03	0,00	0,03
LPA	*Lycodes paamiuti*	0,70	0,00	0,70	0,03	0,00	0,03
SYN	*Synapobranchus kaupi*	1,41	0,00	1,41	0,03	0,00	0,03
NEG	*Neolithodes grimaldii*	0,10	0,00	0,10	0,03	0,00	0,03
WIT	*Glyptocephalus cynoglossus*	0,08	0,00	0,08	0,03	0,00	0,03
AMM	*Ammodytes marinus*	2,74	0,00	2,74	0,02	0,00	0,02
COM	*Cottunculus microps*	0,03	0,35	0,38	0,00	0,02	0,02
LMC	*Lampanyctus macdonaldi*	2,10	0,21	2,32	0,02	0,00	0,02
ARZ	*Arctozenius rissoi*	0,39	0,08	0,47	0,01	0,00	0,02
KCT	*Lithodes maja*	0,05	0,25	0,29	0,00	0,01	0,02
HAL	*Hippoglossus hippoglossus*	0,01	0,00	0,01	0,02	0,00	0,02
EUD	*Leptagonus decagonus*	2,05	0,00	2,05	0,02	0,00	0,02
LYE	*Lycodes esmarkii*	0,02	0,10	0,12	0,01	0,01	0,01
SKA	*Raja sp.*	0,01	0,00	0,01	0,01	0,00	0,01
RNG	*Coryphaenoides rupestris*	0,28	0,06	0,34	0,01	0,01	0,01
ONA	*Gaidropsarus argentatus*	0,05	0,28	0,32	0,01	0,01	0,01
ASP	*Aspidophoroides monopterygius*	2,76	0,00	2,76	0,01	0,00	0,01
LYY	*Lycenchelys sp.*	0,95	0,00	0,95	0,01	0,00	0,01
LEP	*Lepidion eques*	0,11	0,00	0,11	0,01	0,00	0,01
BAA	*Bathypolypus arcticus*	0,09	0,00	0,09	0,01	0,00	0,01
LIG	*Liparis gibbus*	0,14	0,00	0,14	0,01	0,00	0,01
SER	*Serrivomer beani*	0,01	0,25	0,26	0,00	0,01	0,01
LYK	*Lycenchelys kolthoffi*	0,80	0,17	0,97	0,01	0,00	0,01
MUG	*Munida tenuimana*	0,00	0,74	0,74	0,00	0,01	0,01
SAN	*Ammodytes sp.*	0,59	0,00	0,59	0,01	0,00	0,01
ARU	*Artediellus uncinatus*	0,21	0,00	0,21	0,00	0,00	0,00
GYR	*Gymnelus retrodorsalis*	0,02	0,69	0,71	0,00	0,00	0,00
BAT	*Bathylagus euryops*	0,28	0,16	0,44	0,00	0,00	0,00
ACT	*Arctogadus glacialis*	0,06	0,00	0,06	0,00	0,00	0,00
ICB	*Icelus bicornis*	0,93	0,00	0,93	0,00	0,00	0,00
NEM	*Nemichthys scolopaceus*	0,01	0,09	0,10	0,00	0,00	0,00
CRM	*Careproctus micropus*	0,43	0,00	0,43	0,00	0,00	0,00
LAS	*Lampadena speculigera*	0,12	0,00	0,12	0,00	0,00	0,00
LIP	*Liparidae*	0,06	0,00	0,06	0,00	0,00	0,00
XEC	*Xenodermichthys copei*	0,00	0,07	0,07	0,00	0,00	0,00
ICS	*Icelus spatula*	0,03	0,27	0,30	0,00	0,00	0,00
BSE	*Bathypolypus sp.*	0,00	0,08	0,08	0,00	0,00	0,00
ANI	*Anisarchus medius*	0,12	0,00	0,12	0,00	0,00	0,00
CLM	*Cyclothone microdon*	0,58	0,00	0,58	0,00	0,00	0,00
EDR	*Eumicrotremus derjugini*	0,02	0,00	0,02	0,00	0,00	0,00
LFA	*Lumpenus fabricii*	0,09	0,00	0,09	0,00	0,00	0,00

MYJ	*Myxine jespersenae*	0,03	0,00	0,03	0,00	0,00	0,00
RBT	*Raja bathyphila*	0,01	0,00	0,01	0,00	0,00	0,00
RMO	*Rossia moelleri*	0,06	0,00	0,06	0,00	0,00	0,00
STO	*Stomias boa*	0,09	0,00	0,09	0,00	0,00	0,00
ULO	*Ulcina olrikii*	0,14	0,00	0,14	0,00	0,00	0,00
SAS	*Sagamichthys schnakenbecki*	0,00	0,02	0,02	0,00	0,00	0,00
MEJ	*Melanocetus johnsoni*	0,00	0,03	0,03	0,00	0,00	0,00
RMA	*Rossia macrosoma*	0,00	0,03	0,03	0,00	0,00	0,00
GYV	*Gymnelus viridis*	0,02	0,09	0,11	0,00	0,00	0,00
POP	*Polyipnus polli*	0,00	0,02	0,02	0,00	0,00	0,00
BOA	*Borostomias antarcticus*	0,01	0,00	0,01	0,00	0,00	0,00
CGR	*Coryphaenoides guentheri*	0,01	0,00	0,01	0,00	0,00	0,00
LAI	*Lampanyctus intricarius*	0,09	0,00	0,09	0,00	0,00	0,00
LYD	*Lampanyctus crocodilus*	0,00	0,00	0,00	0,00	0,00	0,00
LYS	*Lycenchelys sarsii*	0,01	0,00	0,01	0,00	0,00	0,00
MAL	*Malacosteus niger*	0,03	0,00	0,03	0,00	0,00	0,00
MAV	*Maurolicus muelleri*	0,01	0,00	0,01	0,00	0,00	0,00
MCD	*Ceratoscopelus maderensis*	0,01	0,00	0,01	0,00	0,00	0,00
MYC	*Myctophidae*	0,05	0,00	0,05	0,00	0,00	0,00
PMP	*Protomyctophum arcticum*	0,02	0,00	0,02	0,00	0,00	0,00
PSP	*Paraliparis sp.*	0,05	0,00	0,05	0,00	0,00	0,00
RPA	*Rossia palpebrosa*	0,02	0,00	0,02	0,00	0,00	0,00
SQU	*Cephalopoda*	0,00	0,00	0,00	0,00	0,00	0,00